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MYCELIUM THERMAL INSULATION MATERIAL

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Abstract – The study explores the potential of mycelium-based materials as sustainable thermal insulation for construction. Mycelium, the vegetative part of fungi, grows on organic substrates such as agricultural byproducts, forming a lightweight, biodegradable composite with insulating properties. Experiments focus on optimizing thermal conductivity, mechanical strength, and environmental sustainability of the material. Mycelium insulation demonstrates thermal conductivity values comparable to traditional materials like mineral wool and expanded polystyrene (EPS), with a range of 0.039 to 0.05 W/m K. The production process employs renewable resources, is non-toxic, and aligns with circular economy principles by repurposing agricultural waste. Challenges remain in enhancing water resistance and mechanical adaptability. The findings underline mycelium's potential as an eco-friendly alternative in modern sustainable construction, emphasizing its role in reducing carbon footprints and promoting resource efficiency.

Keywords – *Agricultural by-product; eco-friendly materials; mycelium; thermal insulation*