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Morphology Study on Mycelium Textile Composite

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Structured Abstract

Background: Composite is a material with a heterogeneous mixture of two or more homogeneous phases bonded together. Biocomposite is a cluster under composite, is made from renewable resources and has gained significant attention on a global scale. Producing a biocomposite with mycelium had been a development that had been around for a while, where it could use textile, food, or agricultural wastes for substrate and could use any type of fibre, either natural fibre or man-made fibre. Nevertheless, much other information has yet to be discovered since using mycelium as a binder was used in the 2000s. The objective of this study was to analyse the growth kinetics and morphology of the mycelium fibres when applied to the textile waste substrate as well as its physical properties.

Methods: Cocopeat, textile waste, and mycelium were used to produce a biocomposite and were divided into two growth conditions: supergrowth and distilled water as nutrients. All the samples were incubated for 2 months, and the composite was dried in an oven and hot press to make a panel. The changes in odour, colour, and surface morphology were observed.

Results: The odour of the samples slowly became bad after 1 month of incubation. The colour of some samples had changed, especially cotton, as it became yellowish. The growth of the mycelium was slow for the first month, and some of the samples had contamination. After 2 months, most samples had positive mycelium growth even though the mycelium did not cover the surface of the sample. However, due to the limited colonisation of mycelium in each sample, only one sample was placed in an oven and hot press. The sample became lightweight and felt like Styrofoam. The smell was less unpleasant, and it became stiffer and denser after the hot press.

Conclusion: In conclusion, textile and agricultural waste could be utilised to produce mycelium textile composites, and this mycelium could be a new source as a matrix. The type of substrate, growth condition, and type of mycelium could also influence the result of the composite. This textile biocomposite has a promising future as it can be used in textile, automotive, and packaging.

Keywords: Biocomposite, Mycelium, Textile waste, Agriculture waste

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