Lifespan and Biodegradation Of **Mycelium Bio-composites**

Paula Jerez Zarandona

Project/Research Group: MycEola (Bio-based Construction Group) **Contact information:** paulajerez34@gmail.com-p.jerezzarandona@student.avans.nl **Date:** 12 June 2025

Introduction

The construction sector needs sustainable alternatives to high-impact materials like cement or plastic [1]. Mycelium-based materials (MBMs) are low-impact, biobased composites made from fungal networks and agricultural waste. Their potential to grow into strong, lightweight structures offers potential for circular use in construction [1]





Results

Lifespan

Thermal Conductivity

- Best Insulation: Oregano Oil
- Worst Insulation: Tea Tree Oil ullet

<u>Compressive Strength</u>

- Most improvement: Impershield B
- Slight decrease: Oregano Oil



However, limited data on their durability and environmental breakdown slows their adoption [2].

This study explores how MBMs retain their properties under interval conditions (spring-like weather) and examines their biodegradation through soil burial experiments to understand their decomposition behavior.



Research Question

How do the properties of MBMs change under environmental conditions, and what is their biodegradation rate when in contact with soil?

& Impershield B

Impershield P remained stable \bullet

No coating improved all properties.

Oregano preserved insulation; Impershield B boosted strength.

Biodegradation

Lifespan

Foams degrade faster than boards

Coated samples degrade more slowly than uncoated samples

Real-life conditions improve biodegradation, likely due to higher biological activity

Estimated full biodegradation time: 6-8 months for foam samples and 9-14 months for board samples.

For future studies, it is recommended to test MBMs under a

vulnerabilities of the material. Testing layered or combined

wider range of environmental conditions, such as extreme

heat, cold, or intense humidity, to reveal potential

Methodology

Advice and Recomendations

MBMs were tested for durability in climate chambers and for biodegradation[3] in both lab and outdoor soil conditions.

Biodegradation Testing Lifespan Testing Samples to test: Foam Coated Samples coated with Foam Uncoated 5 treatments Board Coated Board Uncoated Impershield A Impershield B 'Real-Life Soil' Controlled Soil Impershield P Burial (CSB) Burial (RLSB) Oregano Oil Tea Tree Oil Measure Measured before and after

coatings may improve the balance between strength and insolation. Biodegradability

> Biodegradation tests should run until complete decomposition to get more accurate timelines. It's also important to analyze how MBMs affect soil quality, including nutrients and microbial activity. Also, varying sample sizes and locations would improve data consistency.

References

1. Alemu et al (2022). International Journal of Biomaterials 2. Alaux at al. (2023 Prospective LCA of MBCs 3. Van Wylick et al., (2022). MBMs Biodegradability





To know more about this project:







