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VALORISATION OF MIXED POST-CONSUMER TEXTILE WASTE THROUGH MYCELIUM-BASED MATERIALS

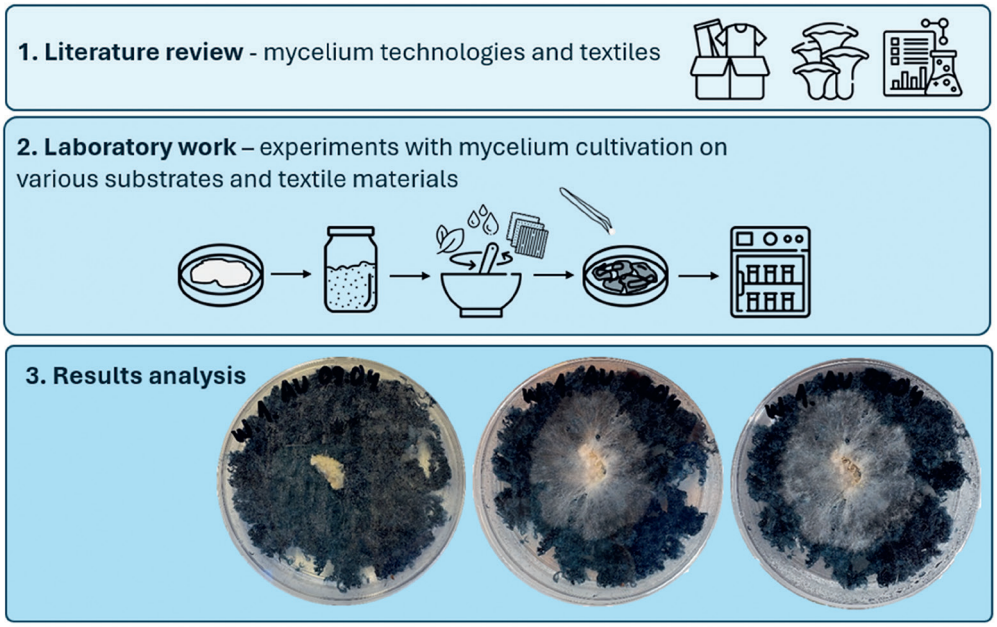
Megija VALTERE[1*], Tereza BEZRUCKO[2], Ilze VAMZA[3], Dagnija BLUMBERGA[4]

[1–4] *Institute of Energy Systems and Environment, Riga Technical University, Azenes iela 12/1, LV-1048 Riga, Latvia*

[*] ***Corresponding author**. Email address: megija.valtere@rtu.lv*

Abstract – The circularity of textiles is currently a very pressing issue, as consumption of textiles continues to grow, and with it the amount of waste, of which only around 25 % is recycled. Solutions are being developed across the entire value chain to implement a circular economy, from eco-design to recycling of post-consumer waste. However, research on the recycling of mixed post-consumer textiles into textiles or products with higher added value is limited. The authors have previously conducted a literature review to identify recycling solutions for mixed post-consumer textile waste and to assess their development potential. The results of comparing several products showed that mycelium material has the greatest potential. Mycelium has long been used in medicine and the food industry, but over the last two decades, new applications for it have been developed in materials science. The mycelium technologies are becoming increasingly attractive because these materials exhibit good technical properties, cost-effectiveness, and low environmental impact. To the best of the author's knowledge, only five studies have so far been carried out on growing mycelium on textile alone or on textile and biomass together, and three of these have successfully led to the development of a mycelium-based composite on a lab scale. Therefore, this study aimed to summarize previous research findings on textile and mycelium and to conduct laboratory experiments to determine the most suitable biomass and textile combination, as well as the most suitable mushroom strain. Experiments were conducted with four mushroom species, two popular and two previously unused in mycelium technology research. Several lignocellulose residues were tested as substrates, with the prospect of finding high-value applications for these residues. Mixed post-consumer textile waste was used as the textile input. The results confirm that textile waste that cannot be recycled back into textile products has potential for use in mycelium-based materials.

Keywords – Circular economy; fungi; mycelium technologies; textile recycling



The methodology framework for the study

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