

BACTERIAL CELLULOSE: A SUSTAINABLE SOLUTION FOR NEXT-GENERATION TEXTILES AND VEGAN LEATHER

Dheanda Absharina^{1,2*}, Csilla Veres¹, Csaba Vágvölgyi¹

¹University of Szeged, Faculty of Science and Informatics, Department of Biotechnology and Microbiology, Szeged, HUNGARY

²University of Szeged, Doctoral School of Biology, Szeged, HUNGARY

*corresponding author: dheanda.absh@gmail.com

The growing interest in sustainable materials has increased the focus on developing resources from renewable systems, especially through biological processes. Bacterial cellulose (BC) is a promising biomaterial recognized for its renewable, biodegradable, and eco-friendly properties. It is gaining attention across industries such as food, pharmaceuticals, materials science, and textiles. In the fashion industry, BC biofabrication offers an innovative approach to creating sustainable textiles and vegan leather.

This poster highlights BC's role in advancing sustainable materials, addressing challenges like low yields, strain instability, and high production costs, and discussing new biofabrication techniques to overcome these issues. Recent efforts aim to improve the thickness, consistency, and strength of BC layers by optimizing environmental and nutritional conditions during *Komagataeibacter* cultivation. Innovations in synthetic biology and genetic engineering are also contributing to more efficient BC production, strengthening its potential in sustainable fashion. Additionally, understanding the interactions between microbial strains and their growth environments has opened new possibilities for enhancing BC quality and scalability. This presentation provides an overview of three main areas: (1) the applications of bacterial cellulose across various industries, (2) biofabrication techniques for producing vegan leather, and (3) recent innovations and patents that utilize BC as a sustainable biomaterial for industrial use. It also emphasizes the importance of continuous research and technological advancements to ensure BC's future role as a key material in sustainable development.