BioWrinkleFree: Sustainable Biopolymer-Based Wrinkle-Free Finishing for Cellulose Textiles

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Abstract

The textile industry is under growing pressure to replace conventional wrinkle-free finishes, often based on formaldehyde-releasing agents, with more sustainable and non-toxic alternatives. Within the BioWrinkleFree project, a continuation of the IGF project 18882N "Wrinklefree", we are investigating biopolymer-based crosslinking systems for imparting wrinkle resistance to cellulose textiles.
Different natural polysaccharides have been investigated in combination with sodium trimetaphosphate (STMP) as a bio-based crosslinking agent. The different polysaccharide systems have been systematically evaluated to identify suitable combinations and processing conditions for achieving durable wrinkle resistance while preserving the intrinsic softness, breathability, and mechanical properties of the fabrics.

The results obtained so far indicate that the performance strongly depends on the nature of the polysaccharide and the processing conditions. Among the systems investigated, dextran has shown the most promising performance under the optimized conditions, providing a significant improvement in wrinkle. Further optimization is ongoing to improve the durability of the treatment and establish the optimal processing window.

The ongoing work focuses on optimizing the treatment conditions, characterizing the resulting textile properties according to relevant industry standards (DIN 53890, ISO 13937-2, ISO 9237), and evaluating the environmental and safety aspects of the developed systems, including Öko-Tex Standard 100 requirements and biodegradability.
The project aims to develop a cost-effective, bio-based and scalable technology for wrinkle-resistant textile finishing, particularly suited to the needs of SMEs. Beyond wrinkle resistance, the developed polysaccharide-based crosslinking approach could potentially be transferred to other textile functionalizations, including flame retardancy and water repellency.

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