MWP

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Project title:
Hydrophobizing cellulose fibers through *in situ* macromolecular dispersion of lignin

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Abstract (200 words)**:**
Almost all of today's textiles are made of two raw materials: cotton and fossil resources. The overuse of these materials rendered textile production the third largest source of water degradation and land use in 2020. Manufactured cellulose fibers (MCFs) produced from wood pulp, agricultural waste or other plants offer a renewable, recyclable, and biodegradable alternative for textiles. However, MCFs are intrinsically hydrophilic, which limits their use in applications such as sportswear and outdoor clothing. As of now, hydrophobic synthetic fibers are practically irreplaceable in these areas.

This work investigates the potential of lignin as a natural hydrophobizing agent in MCFs. The Ioncell® technology enables the direct dissolution of lignocellulosic material in a super-base based ionic liquid. Subsequent dry-jet wet spinning yields high-performance Lyocell-type fibers for textile application. Lignin can alter their surface wettability and moisture absorption. Direct incorporation into the fiber matrix increases the fastness properties, since coatings are prone to delaminate under external stress, such as laundering.

The results show the potential of bio-based textile fibers to expand into market areas that are currently dominated by synthetic fibers. Aside from the environmental benefits, this will strengthen the local production of textile fibers and add value to the forest industry.

Key words:
MCF, regenerated lignocellulose, textile fibers, hydrophobic, lignin