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Chemically modified kraft pulps to improve the sustainability of regenerated fibres

In the textile production value chain, especially finishing treatments and dyeing of textiles, causes extensive fresh water pollution. Cellulose based textile fibres with tailored properties; such as fibres with accessible functional groups and cationic groups that enable water scarce after treatments, e.g. dyeing and finishing, give possibility to decrease environmental footprint of the textile value chain. Additionally, the use of kraft pulp as feedstock for regenerated fibres will enhance the use of wood biomass.

Two heterogeneous modification routes i.e., cationization and allylation, are shown to be promising in chemical modification of kraft pulps containing substantial amount of hemicellulose. The cationization method used here yielded in a permanent cationic charge to the fibres to be utilized for example in improved dye absorption during reactive dyeing. The allylation yield in reactive double bonds in fibres can be used for many kind of post-modification chemistries such as grafting or so-called “click” modification methods. The allyl and cationic substituents of modified kraft pulps were observed to be very stable when the degree of substitution was determined from pulp fibres before and after dissolution in ionic liquids [mTBNH][AcO] and regeneration. The target of the chemical modifications of pulp is to improve the technical properties of the regenerated modified fibres. For instance, improved dye adsorption, reduced pilling and improved fire resistance are targeted in the final regenerated fibres.