

Paper Waste Recycling: Green Textile Product

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ABSTRACT

The high demand for cellulose in the apparel industry is unsustainable, and traditional man-made cellulose often relies on dissolving wood pulp and environmentally harmful chemicals. Wastepaper, which is usually composed of extensively shortened cellulose fibers unsuitable for high-grade paper, ends up as a low-value product or is sent to landfills. The study focuses on recycling efficiency of wastepaper into cellulose nanocrystals (CNCs) for future applications, particularly in the textile industry, to reduce the use of petrochemical-based polymers and for water conservation in dyeing processes (dyed nanocellulose dispersion method). In this study, CNCs were extracted economically by following specific procedures (deinking, alkaline hydrolysis, bleaching, and acid hydrolysis) to produce cellulose nanocrystalline regions (CNCs). The obtained product was neutralized, dried, and ground into powder form. XRD, FTIR, and SEM studies confirmed the presence of extracted CNCs. The fabricated CNCs will soon be employed for textile coating or slurries to enhance the mechanical properties of coated textiles and the water conservation in the eco-friendly dyeing processes by developing a dispersion consisting of dye and cellulose.

Keywords: Recycling, Wastepaper, Cellulose Nanocrystals (CNCs), Characterizations, Dyed Nanocellulose Dispersion.
