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Effect of Self-Assembled Iron-Tannic Nanoparticles on Fastness and Antibacterial Properties of Natural Indigo (Strobilanthes Cusia) Dyed Cotton Fabrics

In this work, self-assembled iron (III)-tannic nanoparticles (Fe-TA NPs) were exploited as an eco-friendly antibacterial finishing agent for natural indigo (*Strobilanthes Cusia*) dyed cotton fabrics. Fe-TA NPs were synthesized at room temperature using an easy, low-cost, and reproducible method without the use of any toxic agents. The interaction between Fe3+ and TA and particle size of Fe-TA NPs were characterized by UV-Vis spectroscopy and dynamic light scattering (DLS). The modified cotton was fabricated using the exhaustion dyeing process. The Fe-TA NPs with different mole ratios of ferric chloride and tannic acid were one-step deposited onto the surface of natural indigo dyed fabrics. The surface morphology, chemical structure, and thermal stability of the modified cotton were investigated using scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FTIR), Raman spectroscopy and Thermogravimetric analysis (TGA), respectively. Furthermore, color, color fastness properties and antibacterial properties of modified samples were evaluated.

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