

Creation of a Functional Cotton Headcover (turban/bonnet) via Lac and Turmeric Natural dyes

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Abstract:

Functional textiles and clothes have attracted increasing attention in recent years. Apparel possessing antibacterial and antioxidant functions can offer health care effects. Cotton head covers with antioxidant and antibacterial functional properties were created by using a sustainable approach in the current study. The sustainability was applied through using microwave dyeing for knitted cotton fabric with lac and turmeric natural dyes as well as chitosan bio-mordanting. The microwave dyeing was optimized by studying the dyeing time (3-11 min), the microwave power (100 - 900 W), salt concentration (0-10 %) for both lac and turmeric dyes, and the pH of the dyeing bath (2-6) for lac dye and (4-8) for turmeric dye. The deposition of chitosan on cotton fabric was confirmed by scanning electron microscopy for the cotton surface. The color strength of cotton fabric reached 11 and 8.3 for lac and turmeric dyes, respectively with no salt dyeing after chitosan treatment. This result was obtained at 450 W, 7 min, and pH 3 for lac dye and 100 W, 3 min, and pH 7 for turmeric dye. both perspiration and washing fastness (the staining on cotton) properties of lac dyed cotton fabrics were enhanced in the case of chitosan treatment. But in the case of turmeric dye, the fastness properties to wash and light were improved after chitosan treatment. The functional properties of antioxidant and antibacterial were evaluated for both lac and turmeric dyed cotton fabric. The antioxidant activity for turmeric and lac dyed cotton fabrics reached 61.25% and 11% respectively. The antibacterial activity against three strains of bacteria (*Bacillus cereus*, *Staphylococcus aureus*, and *Escherichia coli*) was evaluated using the turbidity method and both lac and turmeric dyes showed antibacterial activity.

Keywords:

Chitosan, Turmeric dye, Fashion, Cotton fabric, Natural dye, Antioxidant

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Paper History:

Paper received 29th July 2022, Accepted 19th September 2022, Published 1st of November 2022