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Feasibility of Chicken Feather Waste as a Renewable Resource for Textile Dyeing Processes

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Abstract : Cotton cationization is an emerging area that solves the environmental problems associated with the reactive dyeing of cotton. In this study, keratin hydrolysate cationizing agent from chicken feather was extracted and optimized to eliminate the usage of salt during dyeing. Cationization of cotton using the extracted keratin hydrolysate and dyeing of the cationized cotton without salt was made. The effect of extraction parametric conditions like concentration of caustic soda, temperature and time were studied on the yield of protein from chicken feather and colour strength (K/S) values, and these process conditions were optimized. The optimum extraction conditions were. 25g/l caustic soda, at 500C temperature and 105 minutes with average yield = 91.2% and 4.32 colour strength value. The effect of salt addition, pH and concentration of cationizing agent on yield colour strength was also studied and optimized. It was observed that slightly acidic condition with 4% (% owf) concentration of cationizing agent gives a better dyeability as compared to normal cotton reactive dyeing. The physical properties of cationized-dyed fabric were assessed, and the result reveals that the cationization has a similar effect as normal dyeing of cotton. The cationization of cotton with keratin extract was found to be successful and economically viable.

Keywords : cotton materials, cationization, reactive dye, keratin hydrolysate
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