

Enhancement of dye-ability and antibacterial properties of cotton fabrics via modification with chitosan

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Abstract:

Replacement of chemical materials are suitable for modern chemical process. Here; cotton fabrics were treated with chitosan at different concentrations followed by dyeing with acidic dye. The colorimetric properties of the dyed cotton fabrics were evaluated. Also, effects of chitosan concentrations on acid dye uptake were studied. The cotton fabrics which were treated with 3% chitosan produce higher values of K/S, light and washing fastness values. In addition, the chitosan concentration effects on antibacterial activity of the treated cotton fabrics were estimated by using *Staphylococcus aureus* (*S. aureus*) as Gram positive bacteria and *Escherichia coli* (*E. coli*) as Gram negative bacteria. Results have shown that cotton fabrics treated with chitosan had higher antibacterial properties because of the chitosan properties. Examining with Scanning electron microscope (SEM) confirmed the deposition of chitosan on the surface of cotton fabrics. Durability towards washing and yellowness of both treated and dyed cotton fabrics were also investigated. Therefore, Chitosan was used to enhance cotton fabrics with very good antibacterial activity. In addition to improving its pigment ability with acidic dye.

I was investigated the dye ability of cotton fabrics with acid dye via pre-treatment with chitosan as antibacterial material. To achieve this hypothesis, we treat cotton fabrics with different concentrations of chitosan through pad-dry-cure method followed by dyeing with acid dye. It was found that chitosan enhances the dye ability of cotton fabrics with acid dye to it can create cationic charges from amino groups on the cotton fabrics surfaces. The optimum concentration of chitosan was 3 % (w/v). also colour fastness properties has been enhanced by chitosan and there was slight increase in yellowness and decrease in lightness due to modification of fabrics with chitosan. Finally, chitosan imparts cotton fabrics also antibacterial activity towards both Gram positive and Gram negative bacteria.

Keywords:

Cotton fabrics, chitosan, Dye-ability, Acid Dyes, Fastness properties, Antibacterial.