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Synthesis, Characterization and Coating of the Zinc Oxide Nanoparticles on Cotton Fabric by Mechanical Thermo-Fixation Techniques to Impart Antimicrobial Activity

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Abstract : The present study reports the synthesis, characterization and application of nano-sized zinc-oxide (ZnO) particles on a cotton fabric surface. The aim of the investigations is to impart the antimicrobial activity on textile cloth. Nanoparticle is synthesized by wet chemical method from zinc sulphate and sodium hydroxide. SEM (scanning electron micrograph) images are taken to demonstrate the surface morphology of nanoparticles. XRD analysis is done to determine the crystal size of the nanoparticle. With the conformation of nanoformation, the cotton woven fabric is treated with ZnO nanoparticle by mechanical thermo-fixation (pad-dry-cure) technique. To increase the wash durability of nano treated fabric, an acrylic binder is used as a fixing agent. The treated fabric shows up to 90% bacterial reduction for S. aureus (Staphylococcus aureus) and 87% for E. coli (Escherichia coli) which is appreciable for bacteria protective clothing.

Keywords : nanoparticle, zinc oxide, cotton fabric, antibacterial activity, binder
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