

ANTIMICROBIAL EFFICACY OF NANO-ZINC OXIDE- COATED CROSS-LINKED COTTON

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This study is concerned with assessing antimicrobial efficacy of zinc oxide (ZnO) nanoparticles attached cotton fabric. The upper layer of the cellulose cotton fabric was carboxymethylated in two successive steps, in sodium hydroxide and in monochloroacetic acid. The highly active carboxylic group was introduced to the terminal end of the carboxymethylated cellulose by treating with 1% HCl solution. The nano ZnO was linked to the extreme end of the surface-active cellulose surface via the carboxylic linkage. The antibacterial activity of the nano ZnO coated and uncoated cotton fabric was investigated using agar diffusion method. Gram positive (*Staphylococcus aureus*) and Gram negative (*Escherichia coli*) bacteria were used as test organisms in the antibacterial activity assessment. An excellent bacterial inhibitory efficacy was exhibited by the finished fabric against *Staphylococcus aureus* and *Escherichia coli* over uncoated cotton fabric. The washing durability was examined up to 50 washing cycles and a significant durability was observed up to 50 washing cycles. The fabric samples were characterized by X-Ray fluorescence and Fourier transform infrared. The Fourier transform Infrared study confirms that the cotton fabrics are modified by layer by layer deposition of monochloroacetate groups followed by ZnO nanoparticless. The X-Ray Fluorescence study confirms the presence of Zn on the modified cotton fabric and decrease in the amount of Zn when subjected to the hand washing cycles.

