

Sonochemical-enzymatic coating of medical textiles with antibacterial nanoparticles

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The spread of bacteria and infections, initially associated with an increased number of hospital-acquired infections, has now extended into the community causing severe and difficult to diagnose and treat diseases. An important preventive measure for providing bacteria-free environment for the patients is the introduction of highly efficient and durable antibacterial textiles in the hospitals. This work reports on a simultaneous sonochemical-enzymatic process for durable antibacterial coating of medical textiles with zinc oxide nanoparticles and natural compounds. The ultrasound irradiation, used for the generation of the nano-structures, and its combination with enzymes (oxidative laccase or hydrolytic cellulase) resulted in “ready-to-use” hybrid coatings on the textiles that significantly inhibited the growth of medically relevant Gram-positive *Staphylococcus aureus* and Gram-negative *Escherichia coli*. The textile materials resisted the intensive laundry regimes used in hospitals and retained their bactericidal activity even after multiple washings cycles. The use of bio-tools and the absence of harsh chemicals define the coating process as a green chemistry approach for design of durable and biocompatible medical textiles.