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SILVER-BASED ANTIBACTERIAL TREATMENTS ON BIOMEDICAL DEVICES FOR DIABETIC PATIENTS

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Silver nanoparticles (AgNPs) have attracted research interests in preventing wound-related infections and recently have been widely used in diabetic foot disease related biomedical devices. In this study, we optimized a specific AgNPs deposition process on natural textiles for the prevention of the infections in diabetic foot. Nano-silver has long been recognized as one of the most effective natural antimicrobial agents, and through ad-hoc optimized photo-activated reaction AgNPs were successfully synthesized in-situ on the fibers of the substrate. Silver nitrate was used as silver precursor, and a hydro-alcoholic solution was used as reducing agent. Three different silver concentrations (0.25% 0.5% and 1 % of Silver Nitrate), two kind of impregnation (dip coating and spray coating) and two different reaction times (10 and 20 minutes) were used as variable of the process. 100% cotton was used as textile substrate, and all the silver-treated samples obtained were tested against different microorganisms including *Escherichia coli (E. coli)* and *Staphylococcus aureus (S. aureus)*, to optimized the specific treatment in terms of antibacterial activity. The results of the agar diffusion test performed on the treated substrates, are shown in the Figure 1. The results showed distinct inhibition zones to proliferation of all the microorganisms tested in the dip coated sample, while no inhibition zones was observed in the spray coated substrates. The inhibition zone was higher than the minimum (1mm) required to be considered a good antibacterial material, according to the standard used (SNV 195920-1992).

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Biography

Riccardo Raho has his expertise in antibacterial treatments for medical devices and green synthesis of natural based hydrogel. Graduated with 110/110 at University of Salento, he did a PhD in material Engineering and nanotechnology at IIT (Italian institute of technology) and University of Salento with a year spent in the University of California Riverside. His PhD was on green synthesis of antibacterial natural based hydrogel for biomedical applications. Now he is part of a funded project for the developing of an advanced sock for the diabetic foot desease named DIABESITY CARE

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