J Med Microb Diagn 2017, 6:2(Suppl)
DOI: 10.4172/2161-0703-C1-006

Making the hospital a safer place by the sonochemical coating of all the textiles and medical devices with antibacterial nanoparticles

D Aharon Gedanken
Bar-Ilan University, Israel

Sonochemistry is an excellent technique to coat nanomaterials on various substrates, imparting new properties to the substrates. After a short demonstration of coating NPs on ceramics and stainless steel, the author will present the coating of textiles such as polyester, cotton, and nylon. In all cases a homogeneous coating of NPs was achieved. Silver is known for generations as antibacterial, and indeed the Ag NPs have killed the Gram-negative E. coli (strain 1313) as well as the Gram-positive *Staphylococcus aureus* (strain 195) bacteria very efficiently. Lately, the FDA shows less enthusiasm towards nanoAg, as a result, we have moved to NPs of ZnO and CuO as antibacterial agents. They were coated on the above-mentioned fabrics and showed excellent antibacterial properties. A special attention was dedicated to the question whether the NPs are leaching off the fabric when washed repeatedly. The coated ZnO NPs on cotton underwent 65 washing cycles at 92°C in water in a hospital washing machine, no NPs were found in the washing solution and the antibacterial behavior was maintained. An experiment in a hospital was conducted in which one room was equipped with antibacterial, bed sheets, pajamas, pillow cover, and bed cover. 22 Patients in this room were probed for bacterial infections. Their infection level was compared with 17 control patient that were using regular textiles. The results are demonstrating that a lower infection level is observed for those patient exposed to the antibacterial textiles. Lately, we have synthesized NPs of a new material, Cu0.89Zn0.11O that kills bacteria 10,000 times better than ZnO or CuO. The mechanism of the killing was studied and will be presented. Coating of catheters with the above mentioned NPs were performed and the coated catheters were inserted in rabbits. Results showed that the urine of the rabbits was not contaminated with bacteria and the growth of biofilm on the catheters is avoided.

drdeanna.rpm@hotmail.comt

Isolation, diversity and biotechnological potential of rhizo- and endophytic-bacteria associated with mangroves plants from Saudi Arabia

Fehmida Bibi, Sana Akhtar Alvi, Muhammad Yasir and **Esam I Azhar**
King Abdulaziz University, Saudi Arabia

Marine bacteria from decades are an exceptional source of halotolerant enzymes. The aim of the present study was to isolate hydrolytic enzyme producing bacteria from seven different mangroves collected from the coastal area of Thuwal, Jeddah, Saudi Arabia and to further screen them for other enzymatic and antifungal activities. We have isolated 46 different enzymatic rhizo and endophytic bacteria from soil, roots and leaves of the mangroves using different enzymatic media. These bacterial strains were capable of producing industrially important enzyme (cellulase, protease, lipase, and amylase). Bacteria were screened further for antagonistic activity against fungal pathogens. Finally these bacterial strains were identified on the basis of 16S rRNA gene sequences. Taxonomic and phylogenetic analysis revealed 95.9-100% sequence identity to type strains of related species. The dominant phylum was gammaproteobacteria (γ-*Proteobacteria*), comprised of 10 different genera; *Erwinia*, *Vibrio, Psychrobacter, Aidingimonas, Marinobacter, Chromohalobacter, Halomonas, Microbulbifer,* and *Alteromonas*. Firmicutes was second dominant phylum comprised of only one genus *Bacillus.* Similarly, only 1 genus *Isoptericola* belongs to Actinobacteria was identified. Further, these enzymatic bacteria were tested for other enzymes production. Most of the active strains showed cellulytic and lipolytic activities. Many of them were also active against fungal pathogens tested. Our results demonstrated that the mangroves represent an important source of potentially active bacteria producing enzyme and antifungal metabolites. It is concluded from this study that mangroves harbor diverse group of bacteria and their bioactive products. These bacteria are source of novel halophilic enzymes and antibiotics of industrial and medicinal use.

mimrannaseer@yahoo.com