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Bacterial infection from burns and overcomes by synergistic combination of antibiotics and essential oils

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Hospital-acquired infections represent a major problem worldwide which result in many dramatic morbidity, mortality among hospitalized patients. The present study aims at evaluation of hospital acquired infections from burns among different hospitals and design a new therapeutic strategy to overcome this problem by determining the combined effect of both antibiotics and essential oils of plants. Out of isolates, 60 bacterial isolates were collected from burns units from two hospitals in Egypt in period from November 2013 to November 2015. Our results showed that 16(26.6%) isolates were Gram positive cocci and 44(73.3%) isolates were Gram negative Bacilli. According to microbiological and biochemical identification method and confirmed using MALDI-TOF, *Pseudomonas aeruginosa* was the most dominant organism 23(38%), followed by *S. aureus* 16(27%), *Klebsiella* spp. 11(18%), *Acinetobacter* spp. 4(7%). Species of *E. coli* 3(5%) and *Proteus* spp. 3(5%) also grown. Antimicrobial susceptibility showed that the resistance level of Gram negative bacteria against tested antibiotics varied from 50% to 100%. Meanwhile, *S. aureus* showed ninety four percent (94%) multi drug resistance. In comparative study of using nineteen essential oils, Cinnamon oil was the most potent oil against all resistant isolates. On the other hand, synergistic interaction of antibiotics and essential oils against multi drug resistant isolates enhancement the activity from 22.8% to 44% as compared with the most active disk alone. Cefoxitin antibiotic and peppermint oil considered as the most active combination against *S. aureus*, thyme oil and imipenem or piperacillin-tazobactam, were the most active combinations against *Enterobacteriaceae*, cinnamon oil with piperacillin or ciprofloxacin antibiotics were the most active combinations against *Pseudomonas*. Synergism in *Acinetobacter baumannii* strains was reported in 37 combinations tested. In conclusion, study revealed the importance of using essential oil and antibiotics combination to overcome hospital acquired infection.

Biography

Neveen Mohamed Saleh has completed her PhD from Ain-Shams University in 2012. Currently she is a Researcher in National Organization for Drug Control and Research, Egypt and is a Visiting Scholar for Post-doctoral studies in Department of Chemistry, Massachusetts University for nanotechnology research. She published more than 10 papers in reputed journals.

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