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Green nanotechnology: Promising antimicrobial activity of oil, silver and sulphur nanoparticles obtained from *Melaleuca alternifolia* against representative skin infecting pathogens

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The plant *Melaleuca alternifolia* (Tea tree) has been used as topical antiseptic remedy for decades. The aim of this study was to investigate antimicrobial activity of tea tree oil (TTO), greenly synthesized silver and Sulphur nanoparticles (AgNPs and SNPs) against representative skin pathogens namely; *Staphylococcus aureus*, Methicillin resistant *Staphylococcus aureus* (MRSA), *Pseudomonas aeruginosa* and *Candida albicans*. TTO was obtained by hydro distillation of plant leaves, while AgNPs and SNPs were prepared in leaves aqueous extract by using silver nitrate and Sodium Thiosulphate respectively. Thirty eight compounds were characterized by GC-MS analysis of TTO, among them Terpinen-4-ol, Limonene, γ -Terpinene, α -Terpinene, Cineol and α -Terpinolene. The result of the bioassay showed that oil possesses potent antimicrobial property especially against MRSA with inhibition zones ranging from 17 to 22 mm compared to standard kanamycin, Polymyxin and Nystatin with no activity against *Pseudomonas aeruginosa*. On the other hand AgNPs and SNPs were characterized by Transmission Electron Microscope (TEM). Both AgNPs and SNPs showed good activities against tested strains with zone of inhibition ranging from 13-16 mm. In conclusion, TTO, AgNPs and SNPs have been found to be effective against selected pathogen and this can provide a cheap broad active alternative to treat related skin infections. These activities prove the use of this plant in folk medicine as well as deserve much more work to develop a micro emulsion based transdermal delivery formulations of TTO and nanoparticles to synergize their antimicrobial abilities.

Biography

Ashraf O. Abdellatif is a PhD student at Microbiology and Immunology department, Faculty of Pharmacy, Cairo University and he has published 3 papers in reputed journals.

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