

Comparative Therapeutic Potential of 'Green Synthesized' Antimicrobials against Scalp Infections

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Abstract : Microbial infections of scalp consist of symptomatic appearances associated with seborrhoeic dermatitis, folliculitis, furuncles, carbuncles and ringworm. The main causative organisms in these scalp-based infections are bacteria like *S. aureus*, *P. aeruginosa* and a fungus *M. Furfur*. Allopathic treatment of these infections is available and efficient, but occasionally, topical applications have been found to cause side effects. India is known as the botanical garden of the world and considered as the epicentre for utilization of traditional drugs. Many treatments based on herb extracts are commonly used in India. It has been observed treatment with ethnomedicines requires a higher dosage and greater time period. Additionally, repeated applications are required to obtain the full efficacy of the treatment. An attempt has been made to imbibe the traditional knowledge with nanotechnology to generate a proficient therapeutic against scalp infections. We have imbibed metallic nanoparticles with extracts from traditional medicines and propose to formulate an antimicrobial hair massager. Four commonly used herbs for treatment against scalp disorders like *Zingiber officinale* (ginger), *Allium sativum* (garlic), *Azadirachta indica* (neem) leaves and *Citrus limon* (lemon) peel was taken. 30 gms of dried homogenized powder was obtained and processed for obtaining the aqueous and ethanolic extract by soxhlet apparatus. The extract was dried and reconstituted to obtain working solution of 1mg/ml. Phytochemical analysis for the obtained extract was done. Synthesis of nanoparticles was mediated by incubating 1mM silver nitrate with extracts of various herbs to obtain silver nanoparticles. The formation of the silver nanoparticles (AgNPs) was monitored using UV-Vis spectroscopy. The AgNPs thus obtained were centrifuged and dried. The AgNPs thus formed were characterized by X Ray Diffraction, scanning electron microscopy and transmission electron microscopy. The size of the AgNPs varied from 10-20 nm and was spherical in shape. *P. aeruginosa* was plated on nutrient agar and comparative antibacterial activity was tested. Comparative antimicrobial potential was calculated for the extracts and the corresponding nanoconstructs. It was found AgNPs were more efficient than their aqueous and ethanolic counterparts except in the case of *C. limon*. Statistical analysis was performed to validate the results obtained.

Keywords : ethnomedicine, nanoconstructs, scalp infections, *Zingiber officinale*

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