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GREEN SYNTHESIS OF SILVER NANOPARTICLES USING WATER EXTRACT OF *PANCHAVALKALA* AND ITS ANTIMICROBIAL ACTIVITY *IN - VITRO*

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'Panchavalkala' is a combination of water extracts of five barks of medicinal plants widely used for treating wounds in ayurvedic medicine. Three different combinations are commonly used as *Panchavalkala* in Sri Lanka. Recently, the synthesis of silver nanoparticles (Ag-NPs) using various plant extracts has become popular due to their cost-effectiveness, affordability, effectiveness, and eco-friendliness. Therefore, the objective of this study was to synthesize silver nanoparticles using the three different combinations of *Panchavalkala* and to assess their antimicrobial activity (AMA) against some common wound pathogens. Three different *Panchavalkala* combinations were prepared using barks of each plant concentrating into 8:1 by boiling; named as A (*F. bengalensis*, *F. racemosa*, *F. religinosa*, *F. arnottiana*, *G. quaesita*), B (*F. bengalensis*, *F. racemosa*, *F. religinosa*, *T. populnea*, *A. indicum*) and C (*F. bengalensis*, *F. racemosa*, *F. religinosa*, *C. cainito*, *G. quaesita*). Ag -NPs were synthesized by mixing 10 ml of each filtered extract with 90 ml of 1 mM aqueous silver nitrate. Synthesis of Ag-NPs was confirmed by the colour change, UV-visible absorbance and scanning electron microscopy (SEM). Screening of AMA was carried out using the agar well diffusion assay on standard isolates of *Escherichia coli*, *Pseudomonas auregenosa*, *Staphylococcus aureus*, methicillin-resistant *Staphylococcus aureus* and *Candida albicans* as well as clinical isolates of methicillin-sensitive *S. aureus* (MSSA) and methicillin-resistant *S. aureus* (MRSA). Ag-NPs synthesized from each combination of *Panchavalkala* showed antimicrobial effects against all the tested microorganisms. Ag-NPs synthesized from samples B and C showed significantly higher effects than sample A against clinical isolates and standard of MRSA and *C. albicans* ($p<0.0001$). Sample B showed significantly higher effects against clinical isolates and standard MSSA ($p<0.0001$) than samples A and C. In conclusion, Ag-NPs synthesized from the above three combinations of *Panchavalkala* were effective against all the tested microorganisms. Further studies are recommended to explore the molecular-level interactions such as drug antagonism, additivism, and synergy of *Panchavalkala* and Ag-NPs.

Keywords: Antimicrobial activity, Green synthesis, Panchavalkala, Silver nanoparticles, Wound pathogens.