



Evaluation of Antibacterial and Disinfectant potency of Biogenic Silver Nanoparticles Synthesized Using *Cyprus rotundus* Against Methicillin Resistant *Staphylococcus aureus* (MRSA)

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ABSTRACT

Methicillin-Resistant *Staphylococcus aureus* (MRSA) is responsible for nosocomial infections and become resistant to most of the antibiotics commonly used. Therefore scientists have taken an extra effort to invent new anti-MRSA antibiotics. However, prevention of the spread of microorganisms is one of the best ways to control nosocomial infections. Silver metal has been used as an antimicrobial agent since ancient times, hence, the development of an effective disinfectant using nanosilver could be an innovative approach to fight against drug-resistant *Staphylococci*. Therefore the present study aimed at the development of a nanosilver preparation using aqueous extract of *Cyprus rotundus* (Kalanduru) and evaluation of its antibacterial and disinfectant potency. *C. rotundus* is widely employed in folk medicine as an antiseptic and also to treat wounds. Here, an aqueous extract of *C. rotundus* whole plant was prepared and the antimicrobial sensitivity test was carried out against *S. aureus*. The crude extract did not show any antibacterial activity. This extract was then utilized for the green synthesis of silver nanoparticles (AgNPs). The formation of metal nanoparticles was monitored by the measurement of the absorbance of the reaction mixture at different time intervals for a period of 72hrs. The silver nano-preparation displayed a high absorbance in the range of 240-260 nm and 420- 440 nm and the absorbance of the reaction mixture increased with time. The scanning electron microscopy (SEM) images confirmed that preparation contains silver nanoparticles of <10 nm size. The preparation was dried by a hot air oven and the antimicrobial activity and Minimum Inhibition Concentration (MIC) of the AgNPs were evaluated. MIC of the preparation was determined as 31.25 µg/mL against *S. aureus* and all five different MRSA strains. Further, the disinfectant activity of the nanopreparation was calculated by conducting a disinfectant assay on rough and smooth surfaces. The mean disinfectant activity of the preparation on rough and smooth surfaces was determined as >99% and >90% respectively. Therefore biogenic silver nanoparticles synthesised from an aqueous extract of *C. rotundus*. show great promise to be developed into a commercial disinfectant.

Keywords: Antimicrobial, Disinfectant, MIC, Silver nanoparticles