TITLE: ANTIMICROBIAL POTENTIAL OF SILVER NANOPARTICLES SYNTHESIZED USING AN AQUEOUS EXTRACT OF *MIMUSOPS CORIACEA*

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ABSTRACT:

Multidrug resistant microrganism infection may lead to increase of mortality and morbidity rates, extend of hospitalization duration, and economic loss. This alarming problem has forced researchers to search for new drugs and molecules in nature, and other sources such as nanoparticles. Naturally produced metal nanoparticles using green synthesis have shown satisfactory results against various microbial species and are nontoxic to the human body. This study aimed to evaluate the antimicrobial activity of silver nanoparticles synthesized using aqueous extract obtained from *Mimusops coriacea* (Mc) leaves. Microbial suspensions S*taphylococcus aureus* ATCC25923, *Escherichia coli* ATCC25922, *Pseudomonas aeruginosa* ATCC27853, and *Candida albicans* ATCC10231; and clinical isolates of methicillin-resistant *S. aureus* (MRSA), *Enterococcus faecalis*, *Escherichia coli* EAEC042 O44:H18, *Klebsiella pneumoniae* (ESBL) and *Stenotrophomonas maltophilia* were treated with different concentrations of nanoparticles (McAgNPs - Mc 25 or 50 g/100mL combined with $AgNO_3$ 1 or 2 mmol/L, with or without photo-reduction process with xenon lamp exposition). Minimum inhibitory concentration (MIC) and Minimal bacterial concentration (MBC) were determined by broth microdilution. The formation of nanoparticle was confirmed using the surface plasmon resonance band at 400 nm for McAgNPs 1 mmol. Zeta potential showed high stability of this solution, up to -30mV, in addition to adequate structure and size, observed by transmission electron microscopy. Nanoparticles tested at a final dilution of 1:40 showed a high percentage of antimicrobial activity (91.34-100%), both for Gram-positive and Gram-negative bacteria, as well as for yeasts, with the best results reached with Mc 50 g/100mL with $AgNO_3$ 2 mmol/L. The MIC of Gram positive strains was obtained at dilution of 1/80-1/640; 1/80-1/2560 for Gram-negative strains and 1/320-1/1280 for yeasts. Several microbial samples suffered greater inhibitory activity after treatment with nanoparticles exposed to photo-reduction. The MBC of Gram positive strains and yeasts was respectively >1/40-1/320 and >1/40, showing higher activity against Gram-negative strains (1/80-1/1280). The present investigation revealed a promising result on *in vitro* efficacy of green synthesized McAgNPs, showing potential to be used in the treatment and prevention of microbial infections.

Keywords: metallic nanoparticles, green synthesis, *Mimusops coriacea*, antimicrobial activity, minimum inhibitory concentration.

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