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Phytochemical And Antimicrobial Activity Of Greenly Synthesized Silver Nanoparticles From Aqueous And Methanol Extracts Of *Vernonia amygdalina* and *Chromolaena odorata* Against *Pseudomonas aeruginosa* and *Proteus mirabilis*

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ABSTRACT

Silver nanoparticles (AgNPs) are well-known to exhibit an effective antimicrobial activity against diverse bacteria which is due to its smaller in size and large surface area. Phytochemical composition and antimicrobial activity of aqueous and methanol extracts of *Vernonia amygdalina* and *Chromolaena odorata* and their silver nanoparticles against *Pseudomonas aeruginosa* and *Proteus mirabilis* was investigated. The silver nanoparticles were characterized using visual observation, Fourier Transform Infrared (FTIR) spectroscopy. Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM) and Electron Dispersive X-ray (EDX). *Pseudomonas* sp. and *Proteus* sp. had 94% relatedness to *Pseudomonas aeruginosa* and *Proteus mirabilis* strain CUAB-ODEDELE02 and CUAB-ODEDELE01 with accession number ON954157 and ON773132. Saponin, alkaloid, tannin, flavonoids and anthraquinones were detected in the plants extracts. FTIR showed the presence of active compounds and functional groups like the alkene, alkane, alcohol and amine, carboxylic, aldehyde, thiol and ketone groups were the major functional groups responsible for the capping and stabilization of the silver nanoparticles. SEM, TEM, and EDX analysis shows spherical particles, without agglomeration and silver as the major element. The aqueous and methanol extracts had varied antibacterial activity against the test pathogens. The silver nanoparticles synthesized using the combination of *Vernonia amygdalina* and *Chromolaena odorata* methanol extracts had a better antagonistic activity against *Pseudomonas aeruginosa* (30.7 mm) and *Proteus mirabilis* (26.7 mm). The silver nanoparticles biosynthesized using combined aqueous extracts of both plants showed low effect against *P. mirabilis* (24.3 mm) and *P. aeruginosa* (14.3mm). The pure extracts and synthesized extracts were more effective against *Pseudomonas aeruginosa* than *Proteus mirabilis* with a zone of inhibition of 33mm. It will be concluded that silver synthesized nanoparticles from the medicinal plants had a significant effect on the isolated compared to crude extracts of medicinal plants. However, more study will be required which will involve the use of mutant strains of these isolates.

Keywords: Phytochemical, Antimicrobial, Silver Nanoparticles, *Vernonia amygdalina*, *Chromolaena odorata* *Pseudomonas aeruginosa*, *Proteus mirabilis*

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