**INVESTIGATING THE EFFECT OF SILVER NANOPARTICLES PRODUCED BY GREEN SYNTHESIS AGAINST STREPTOMYCIN RESISTANT *KLEBSIELLA PNEUMONIAE* AND AMPICILLIN RESISTANT *ESCHERICHIA. COLI* STRAINS.**

**BY**

**Shantel Moyo and Travers K. Chirova.**

**ABSTRACT**

Antibiotic resistance is one of the most serious public health issues of our day, linked to high mortality rates and the potential to kill even more people in the future. The aim of this research was to assess how silver nanoparticles (AgNPs) made through green synthesis would perform against streptomycin-resistant *Klebsiella pneumoniae* and ampicillin-resistant *Escherichia coli* bacteria. Nano-sized metals have been proposed as a potential remedy for antimicrobial resistance in bacteria. In this study, plant extracts (*Zingiber officinale*, *Magnifera indica*, *Allium sativum* and *Aloe vera*) were used to successfully reduce silver ions from silver nitrate (AgNO3) to nano-sized particles. UV spectrophotometry was used to validate the presence of AgNPs and to assess the impact of variables such as pH, incubation period, extract volume, and AgNO3 concentration. The disk diffusion method, MIC, MBC were used to assess the antibacterial efficacy of green synthesized AgNPs against Gram-negative multidrug resistant microorganisms (MDR). The study also looked at the synergistic effect of produced AgNPs with antibiotics (ampicillin and streptomycin), and the results were examined using the ANOVA test. Obtained results showed that the synthesized nanoparticles were more effective towards *E. coli* than *K. pneumoniae* as *E. coli* overally showed greater zones of inhibition signifying greater susceptibility. Ginger extract AgNPs had the largest clear zone of inhibition in both *K. pneumoniae* and *E. coli* MDR strains (4.25mm and 3.1mm respectively) indicating that it has the highest antibacterial activity and has great potential in treating infectious diseases caused by MDR bacteria. *Aloe vera* nanoparticles showed very low antibacterial activity (1.6mm average zone). In the MBC assay ginger AgNPs proved to be a suitable treatment as growth of bacteria only occurred up to the plate with 12.5mg/ml of AgNPs therefore low doses would be required for desired function of the antimicrobial. One way ANOVA test resulted in the p value which was greater than 0.05 thus it was concluded that there is no significant difference between the means of the 5 groups of antimicrobials which were investigated. Nanoparticles can thus fill up the huge gap of being an alternative in the development of an antimicrobial against MDR bacteria to reduce infections.