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SYNTHESIS AND EVALUATION OF THE ANTIMICROBIAL ACTIVITY OF COBALT SUBSTITUTED $MgFe_2O_4$ NANOPARTICLES

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ABSTRACT

The high incidence of infectious disease and increase in the incidence of antibiotic resistance has led to the application of inorganic nanoparticles as novel antimicrobial agents owing to their unique physical and chemical properties. The present study reports the synthesis and antimicrobial activity of $MgFe_2O_4$ and $Co_{0.8}Mg_{0.2}Fe_2O_4$ nanoparticles (NPs). The NPs were synthesized using the low temperature combustion synthesis and the synthesized NPs were characterized by X-ray diffraction (XRD), scanning electron microscope (SEM) and energy dispersive absorption spectroscopy (EDAX). The synthesized NPs exhibited good antimicrobial activity against *Escherichia coli (E. coli)*, *Pseudomonas aeruginosa (P. aeruginosa)*, *Staphylococcus aureus (S. aureus)* and *Serratia marcescens (S. marcescens)*. $Co_{0.8}Mg_{0.2}Fe_2O_4$ NPs showed higher zone of inhibition than $MgFe_2O_4$ NPs for *E. coli* and *S. aureus* with a minimum inhibitory concentration of 2.5 mg/ml as compared to gentamicin as standard antibiotic. The relatively large zone of inhibition exhibited by $Co_{0.8}Mg_{0.2}Fe_2O_4$ on *E. coli* and *S. aureus* suggests its potentials in the treatment of infections commonly associated with these microorganisms.

Keywords: Nanoparticles, Antimicrobial activity, Combustion synthesis, zone of inhibition