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Biosynthesis, characterization and antimicrobial potential of bioactive metabolites, silver nanoparticle from *Bacillus* spp. and some antibiotics against multidrug resistant *Salmonella* spp

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The synthesis of nanoparticles using microorganism and their metabolites are of increasing interest because they are potential producer of biocompatible and environmental friendly nanoparticles. Their nanoparticles can serve as potent alternatives to antibiotics against multidrug resistance bacteria. The antimicrobial potential of metabolites and SNPs biosynthesized from *Bacillus* spp. was characterized using visual observation, UV-visible spectrophotometric, fourier transform infrared (FTIR) and scanning electron microscope (SEM). The effect of physicochemical parameters on SNPs and the antimicrobial activity of the SNPs and combination of SNPs and antibiotics against multidrug resistant (MDR) *Salmonella* strains were evaluated. The bioactive metabolites of the *Bacillus* spp. exhibited varied antimicrobial potential against the tested MDR *Salmonella* spp. The metabolites were able to bio-reduced AgNO₃ to Ag⁺ for SNPs biosynthesis. Change in color from whitish to darkish brown and surface plasma resonance (SPR) peak of 600–800 nm was observed. The SNPs were aggregated, rods and crystalline in shape. Carboxylic acid, amino acid, alcohol, esters and aldehydes were the functional group found in the biosynthesized SNPs. The antibacterial activity of BAC1-SNPs, BAC7-SNPs and BAC20-SNPs against the MDRSA9 and MDRSA18 ranged from 6.0 – 22 mm and 11 – 20 mm. SNPs biosynthesized at pH 7 and 10mM AgNO₃ had the highest antagonistic activity. Combination of SNPs and antibiotics exhibited the best antagonistic potential. Conclusively, bioactive metabolites and SNPs from *Bacillus* spp. exhibited antagonistic effect against MDR *Salmonella* spp. the combined SNPs and antibiotics had better antimicrobial activity.

Biography

Bukola Christianah Adebayo-Tayo has completed her PhD from University of Ibadan. She is a Lecturer in the Department of Microbiology, University of Ibadan. She has published more than 70 papers in reputable journals. She has supervised both undergraduate and postgraduate students. She has six PhD students under her supervision.

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