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Opinion

Evaluation of Conventional Antibiotics and *Ocimum gratissimum* /Metallic Sulfur Mediated Nanoparticles Against Endophytic Leguminous Bacteria and Selected Clinical Isolates

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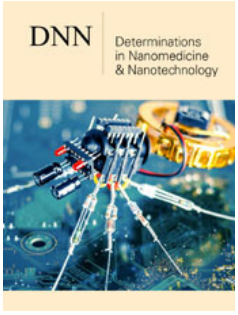

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Abstract

The purpose of this research work is to isolate, identify and characterize organisms from in the endosphere of leguminous plants, determine the susceptibility pattern of endophytic bacteria to two sulfur nanoparticles synthesized in the presence and absence of *Ocimum gratissimum*, to compare the antibiotic susceptibility assay of isolated bacteria using Cephalosporin (oxoid) and multiple susceptibility disc.

Keyword: Conventional antibiotics; *Ocimum gratissimum*; Metallic sulfur mediated nanoparticles; Endophytic leguminous bacteria

Opinion

This research work shows the comparative study of conventional antibiotics and metallic sulfur nanoparticles against selected clinical isolates as a confirmatory assay between the activity of metallic sulfur nanoparticles and conventional antibiotics. Mature plant specimen of three leguminous plants; *Mucuna pruriens, Calopogonium mucunoides* and *Vigna unguiculata* were collected. The plant specimen were surface-sterilized, isolation, characterization and identification of endophytic bacteria isolate which were performed using biochemical test, sugar fermentation and Bergey's manual. Sodium thiosulfate pentahydrate ($Na_2S_2O_3.5H_2O$, 99%), citric acid ($C_6H_8O_7$, AR) with fresh leaves of *Ocimum gratissimum* were used in the preparation of sulfur nanoparticles symbolled by SNP1 and SNP2 (Solid reflectance spectra), SNP2 was synthesized in absence of *O. gratissimum* both were characterized on shimadzu UV-VIS-NIR spectrophotometer UV-3100 with a MPCF-3100 sample compartment, the Infrared spectra were recorded with a Thermo Fisher Scientific FTIR spectrophotometer. Antimicrobial susceptibility test for both the endophytic isolates and clinical isolates were done using Kirby-Bauer disc diffusion technique, the same procedure were repeated for the two sulfur nanoparticles. It was observed that the leguminous plant used contains bacteria isolates between 9-22 number of colonies and during Gram staining, all the endophytic isolates were found to be Gram positive rods. The probable organisms were *Microbacterium lacticum*, *Cellulomonasflavigena* and *Bacillus spp*. All endophytic bacteria were resistant to antimicrobial susceptibility test using Cephalosporins (oxoid) and multiple susceptibility disc with diameter of 11-20mm. Endophytic bacteria were susceptible to the SNP1 sulfur nanoparticles with 9-14mm diameter zones of inhibition while they were resistant to SNP2 sulfur nanoparticles. The clinical isolates were susceptible to multiple susceptibility disc with diameter of 11-20mm, susceptible to SNP1 with diameter of 18-20mm and resistant to SNP2. The study discovered the resistance of endophytic bacterial isolate to cephalosporin, *O. gratissimumcan* increase the efficacy of sulfur nanoparticles as a potential alternative to antibiotics in this widespread antibiotic's resistance era.