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Commentary

# Evaluation of Conventional Antibiotics and *Ocimum gratissimum*/Metallic Sulfur Mediated Nano-Particles against Endophytic Leguminous Bacteria and Selected Clinical Isolates

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**COMMENTARY**

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. 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 ($Na_2S_2O_3.5H_2$ O, 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 was repeated for the two sulfur nanoparticles. It was observed that the leguminous plant used contains bacteria isolates between 9-22 numbers of colonies and during Gram staining, all the endophytic isolates were found to be Gram positive rods. The probable organisms were *Microbacterium lacticum, Cellulomonas flavigena* 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. gratissimum* can increase the efficacy of sulfur nanoparticles as a potential alternative to antibiotics in this widespread antibiotics resistance era.

The rise in antibiotic-resistant microbes in last five decades or more has emerged as a big crisis and a serious threat in every region of the world. The increasing ineffectiveness in the antibiotic activities used for controlling plant and animal pathogen has become a big challenge among researchers, clinicians and policymakers. Antimicrobial synthetic products used in food industries are even not safer as for the human health is concerned, leading to chemical toxicity. Although the new science of molecular-microbial interaction helps in understanding and resolving the antibiotic-resistant complex mechanism, but the more success lies in discovery of new medicines to control infections in this twenty-first century resistance era and also to provide valuable information on medicinal plant, their parts used and methods of preparation for treating various diseases. Altogether these and many more allied issues have drawn curiosity in searching for a new drug formulation that are safer as food preservative and can control diseases and food contamination caused by microbial activities.

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