ABSTRACT

This study focuses on the application of nanotechnology in the green biosynthesis of nanoparticles through the leaf extract of traditional medicinal plant *Moringa oleifera*. As compared to the conventional modes of synthesis like physical and chemical synthesis, this approach has proved to be highly effective, economical, safe, non-toxic and environment friendly. It was observed that *Moringa oleifera* extract with the aid of silver nitrate can reduce silver ions into silver nanoparticles (AgNPs). The resultant nanoparticles were further characterized through various techniques like UV-vis spectroscopy to reveal the confirmation of AgNPs through the absorbance range between the wavelength of 200-400nm. The Scanning Electron Microscopy (SEM) resulted in the revelation of the size of 48nm and round/spherical shape of AgNPs. The Fourier Transform Infrared Spectroscopy (FTIR) analysis exhibited the essential functional groups present in the nanoparticles like alcoholic, phenolic, amide I and amide II and phosphate groups evident by its peaks. The X-ray Diffraction pattern depicted the crystalline planes and crystalline nature of AgNPs. The antimicrobial efficacy of AgNPs was revealed through investigation by using method of agar well diffusion. The antibacterial efficiency was exhibited against five bacterial strains like *Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa Staphylococcus aureus* and *Bacillus subtilis*. The bactericidal activity of AgNPs was evident through apparent zones of inhibitions in mm. The fungicidal activity was also demonstrated through AgNPs by the appearance of zones of inhibitions against two strains of fungi i.e., *Aspergillus niger* and *Aspergillus parasiticus*. All these parameters confirm the potential of silver nanoparticles to be used in biomedical, drug delivery and therapeutic advances in future.