**Abstract**

Objective: Synthesis of silver nanoparticles (AgNPs) using a simple, cost-effective and environmentally friendly green route approach and to study the antibacterial activity of AgNPs against human pathogens.

Methods: Green route approach is used to synthesize AgNPs using Psidiumguajava leaf extract. Fourier transform infrared (FTIR) was used to identify the presence of the functional group. X-ray diffraction (XRD) was used to analyze the structure of prepared AgNPs. Energy dispersive X-ray was used to the characteristic to the composition of the prepared nanoparticles. Size and morphology of the prepared AgNPs were investigated using field emission scanning electron microscopy (FESEM) and transmission electron microscopy (TEM) analysis. Antibacterials efficiency of prepared AgNPs was tested against Escherichia coli and Staphylococcus aureus by well diffusion methods.

Results: FTIR study shows the presence of different functional groups present in the leaves mediated AgNPs. The XRD studies yield diffraction peaks corresponding to face-centered cubic structure of Ag crystals. Spherical shaped AgNPs with a particle size of about ~55 nm were evidenced using FESEM and TEM analysis. Energy dispersive spectrum of the synthesized AgNPs confirms the presence of silver in the prepared nanoparticles. From UV-VIS analysis it is shown that the absorption band was red-shifted from 430 nm to 456 nm. The prepared AgNPs shows good antibacterial activity against E. coli and S. aureus.

Conclusions: P. guajava leaf extract is a potential reducing agent to synthesize AgNPs. The green synthesis approach provides cost-effective and ecofriendly nanoparticles, which could be used in biomedical applications