

Abstract

In this study, a rapid and eco-friendly synthesis of silver nanoparticles (AgNPs) has been reported using aqueous extract of *Scrophularia striata* flower. The extract acts as reducing as well as stabilizing agent. To obtain the optimized conditions for synthesis of AgNPs, the effect of process variables such as extract concentration, concentration ratio of the reactants and time were studied using UV–Vis spectroscopy. The UV–Vis results showed a peak at 440 nm corresponding to the surface plasmon resonance in the optimized conditions (10% extract concentration, 1:1.5 concentration ratio of the reactants and time of 24 h). The synthesized AgNPs were also characterized using X-ray diffraction (XRD), Field emission scanning electron microscopy (FESEM) and Fourier transform infrared spectroscopy (FTIR). According to the XRD patterns, the size of the AgNPs was obtained in the range of 8-12nm. The FESEM images showed the spherical shape of AgNPs. The FTIR spectrum showed the presence of various functional groups such as hydroxyl, amine and carbonyl groups. Finally, the antibacterial activity of the synthesized AgNPs was evaluated against *Staphylococcus aureus* (Gram positive) and *Escherichia coli* (Gram negative). The results showed that the colloidal solution of AgNPs has antibacterial activity against two different strains of bacteria.

Keywords: Eco-friendly synthesis; Silver nanoparticles; *Scrophularia striata*; Antibacterial activity; *Staphylococcus aureus*; *Escherichia coli*



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**Rapid and Eco-friendly Synthesis of Silver
Nanoparticles Using *Scrophularia striata* Flower
and Evaluation of their Antibacterial Activity**

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