

Synthesis of Plant-Mediated Silver Nanoparticles Using *Erythrina indica* Extract and Evaluation of Their Anti-Microbial Activities

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Abstract : The green synthesis of metallic nanoparticles (NPs) involves biocompatible ingredients under physiological conditions of temperature and pressure. Moreover, the biologically active molecules involved in the green synthesis of NPs act as functionalizing ligands, making these NPs more suitable for biomedical applications. Among the most important bioreductants are plant extracts, which are relatively easy to handle, readily available, low cost, and have been well explored for the green synthesis of other nanomaterials. Various types of metallic NPs have already been synthesized using plant extracts. They have wide applicability in various areas such as electronics, catalysis, chemistry, energy, and medicine. Metallic nanoparticles are traditionally synthesized by wet chemical techniques, where the chemicals used are quite often toxic and flammable. In our study, we were described a cost effective and environment friendly technique for green synthesis of silver nanoparticles from 1mM AgNO₃ solution through the aqueous extract of *Erythrina indica* as reducing as well as capping agent. Nanoparticles were characterized using UV-Vis absorption spectroscopy, FTIR, XRD, X-ray diffraction, SEM and TEM analysis showed the average particle size of 30 nm as well as revealed their spherical structure. Further these biologically synthesized nanoparticles were found to be highly toxic against different human pathogens viz. two Gram positive namely *Klebsiella pneumonia* and *Bacillus subtilis* bacteria and two were Gram negative bacteria namely *Staphylococcus aureus* and *Escherichia coli* (E. coli). This is for the first time reporting that *Erythrina indica* plant extract was used for the synthesis of nanoparticles.

Keywords : silver nanoparticles, green synthesis, antibacterial activity, FTIR, TEM, SEM

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