

ABSTRACT

Advancement of treatment of diseases in pharmaceutical and medical field is the result of nanotechnology which is a burgeoning arena with myriad of prospects and possibilities. The amalgamation of this nanotechnology with biotechnology into controlled design of functional nanomaterials became possible, by mimicking nature, assuming that biological system is an organized network framed naturally with nanomaterials, and hence man-made nanostructures can become biocompatible. Encouraged by this philosophy, pathway of natural nanomaterial manufacturing and the properties offered by these, in our advanced research we have synthesized bio-shell-metal-core nanoparticles using different microorganisms, plant extract and bio-excretories as reducing agents. Treatment of different natural reducing agent with the aqueous solution of noble metal salt produced functionalized nanoparticles of core-shell morphology regulating the composition and dimension. The morphological studies of the biosynthesized nanoparticles are done using UV-vis, TEM, FESEM, & AFM techniques. The nanoparticles formation takes place within short time as the reaction is completed few minutes. The EDAX and XRD confirm the crystallinity of the particles. This green-clean synthetic process is conducted in natural environmental conditions. Possible mechanism of the biosynthesis is studied by FTIR and TGA. The stability studies of the colloidal nanoparticles solution are done using

zeta potential analyzers which confirm that the solution is stable for many weeks. Study of bio-functionalized AgNP is done for *in-vitro* free-radical scavenging activity using DPPH method and antimicrobial studies are carried out on both gram positive and negative microbes. In free radical scavenging study, we observed that the AgNP mopped up the free radicals in dose dependent manner. These nanoparticles prove to be toxic against human pathogens and the effect of AgNP is concentration dependent and independent of the type of strains. *In-vitro* anti-malignant activity on four different cell lines is studied using functionalized AuNP. Both the microscopic and XTT study infer that the functionalized AuNP synthesized with aqueous clove bud extract showed a satisfactory anti-cancer effect on all the cell lines. Looking to the beneficial effect of cow urine as an anti-malignant agent, the preliminary studies with respect to it is submitted for potentization.