

ABSTRACT

In this study synthesis of gold nanoparticles was executed using bacteria *Bacillus circulane*, which is cost effective and ecofriendly. Different applications of synthesized nanoparticles was studied such as anti-oxidant activity and catalytic activity in degradation of dyes. Gold nanoparticles were synthesized by using tetrachloroauric acid trihydrate salt solution and *Bacillus circulane* extract. Extracellular enzymes were used for reduction Au^{3+} to Au^0 . Method optimization was also done by changing different factors such as temperature, pH, and concentration of salt solution and extract. For characterization of gold nanoparticles different techniques were applied such as UV-Vis, FTIR and XRD. Antioxidant activity was studied using ABTS and DPPH. Gold nanoparticles synthesized by using microorganism show good antioxidant activity in ABTS but not in DPPH. GNPs also showed good catalytic activity for degradation of methylene blue and methyl orange. Au-NPs showed good catalytic activity for the degradation of dyes both on heating and under sunlight.