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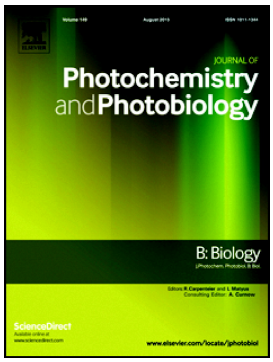

Green synthesis, characterization and catalytic degradation studies of gold nanoparticles against Congo Red and Methyl Orange

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Green synthesis, characterization and catalytic degradation studies of gold nanoparticles against Congo Red and Methyl Orange

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Abstract

The present study reports, novel and greener method for synthesis of gold nanoparticles (AuNPs) using 5,7-dihydroxy-6-metoxy-3',4' methylenedioxyisoflavone (Dalspinin), isolated from the roots of *Dalbergia coromandeliana* was carried out for the first time. The synthesized gold nanoparticles were characterized by UV-Vis spectroscopy, high resolution transmission electron microscopy (HR-TEM), selected area electron diffraction (SAED), Fourier transform infrared spectroscopy (FT-IR) and X-ray diffraction (XRD). The observed surface plasmon resonance (SPR) at 532 nm in the UV-Vis absorption spectrum indicates the formation of gold nanoparticles. The powder XRD and SAED pattern for synthesized gold nanoparticles confirms crystalline nature. The HR-TEM images showed that the AuNPs formed were small in size, highly monodispersed and spherical in shape. The average particle sizes of the AuNPs are found to be ~10.5 nm. The prepared AuNPs were found to be stable for more than 5 months without any aggregation. The catalytic degradation studies of the synthesized AuNPs towards egradation of Congo red and Methyl orange, showed good catalytic in the complete degradation of both the dyes. The reduction catalyzed by gold nanoparticles followed the pseudo-first order kinetics, with a rate constant of 4.5×10^{-3} S^{-1} (R^2 = 0.9959) and 1.7×10^{-3} S^{-1} (R^2 = 0.9918) for Congo red (CR) and Methyl orange (MO), respectively.