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Green synthesis of iron nanoparticles using Curry leaves (*Murraya koenigii*) extract

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The desire to synthesize metallic nanoparticles in a simple and eco-friendly manner has grown in recent years. Iron nanoparticles (FeNPs) are conventionally synthesized using physical and chemical processes. However, due to the limits of existing methods, the focus of research has recently switched to the development of clean and eco-friendly synthesis protocols. Green synthesis of FeNPs is gaining popularity as a simple and eco-friendly process. In this study, Curry leaves (*Murraya koenigii*) were used as reducing and stabilizing agents in the synthesis of FeNPs. The fresh Curry leaves aqueous extract can reduce Fe³⁺ into FeNPs at room temperature. The green synthesized FeNPs were characterized by scanning electron microscopy (SEM) analysis, energy dispersive spectroscopy (EDS) analysis, X-ray diffraction (XRD) analysis, Fourier transform infrared (FTIR) analysis and UV-Visible (UV-Vis) Spectroscopy analysis. SEM images showed that the particles were on the nanoscale and the morphology of particles showed spherical shapes like the appearance. EDS analysis showed the presence of elemental iron and indicated that the nanoparticles are essentially present in metal form. The XRD spectrum observed the crystal structure of the synthesized iron nanoparticles. The FTIR spectrum exhibited different characteristic bands, which indicated the different functional groups of the active components. The UV-Visible analysis observed the absorption peaks at the 240 – 310 nm region due to the excitation of surface plasmon vibrations of the FeNPs and the maximum peak was shown at 273 nm. Furthermore, the green synthesis method from synthesized FeNPs can be applied to a wide range of industrial applications.

Keywords: *Eco-friendly, Green-synthesis, Iron nanoparticles, Curry leaves.*

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