



Dye degradation studies catalysed by green synthesized Iron oxide nanoparticles

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Abstract : Iron oxide nanoparticles were synthesized using aqueous extract of *Piper betle* leaves through rapid single step method which could be suitably scaled up for large-scale production. The phenolic compounds present in the leaf extract were found to work as reducing and capping agent facilitating the formation of nanoparticles. The synthesized iron oxide nanoparticles were characterized by UV-Vis Spectroscopy, scanning electron microscopy, atomic force microscopy and transmission electron microscopy. Both scanning electron microscopy and atomic force microscopy analysis show that surface of the iron oxide nanoparticles were well capped by the phenolic groups present in *Piper betle*. Transmission electron microscopy analysis confirmed the spherical shape of the iron oxide nanoparticles with an average particle size of 16 nm. Energy dispersive X- ray spectroscopy showed the presence of elemental iron and oxygen indicating that the nanoparticles are essentially present in oxide form. The synthesized iron oxide nanoparticles were utilized as green catalyst for the effective decolourization of malachite green and methyl orange.

Keywords : Iron oxide nanoparticles; *Piper betle*; Methyl orange; Malachite green; Degradation.

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