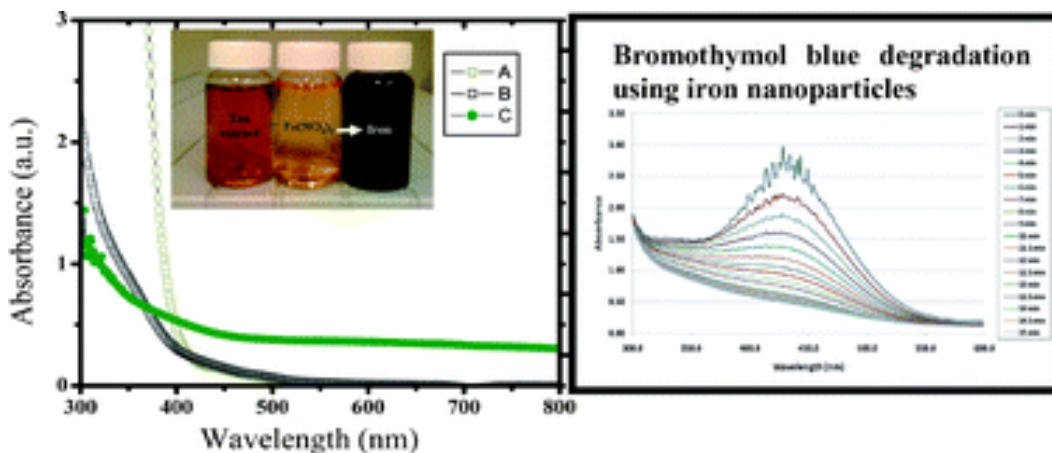


# Degradation of bromothymol blue by 'greener' nano-scale zero-valent iron synthesized using tea polyphenols

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A green single-step synthesis of iron nanoparticles using tea (*Camellia sinensis*) polyphenols is described that uses no additional surfactants/polymers as capping or reducing agents. The expedient reaction between polyphenols and ferric nitrate occurs within a few minutes at room temperature and is indicated by color changes from pale yellow to dark greenish/black in the formation of iron nanoparticles. The synthesized iron nanoparticles were characterized using transmission electron microscopy (TEM), UV-visible and X-ray diffraction pattern (XRD). The obtained nanoparticles were utilized to catalyze hydrogen peroxide for treatment of organic contamination and results were compared with Fe-EDTA and Fe-EDDS. Bromothymol blue, a commonly deployed pH indicator, is used here as a model contaminant for free radical reactions, due to its stability in the presence of H<sub>2</sub>O<sub>2</sub> and its absorbance in the visible range at pH 6. The concentration of bromothymol blue is conveniently monitored using ultraviolet-visible (UV-Vis) spectroscopy during treatment with iron-catalyzed H<sub>2</sub>O<sub>2</sub>. Various concentrations of iron are tested to allow for the determination of initial rate constants for the different iron sources.



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