

Abstract

Industrial dyes have caused havoc to environment and creatures, and several techniques has been devised to alleviate the threat. In this aspect, metal oxide nanoparticles (MONPs) with a plant extract based reducing agent are investigated. Bio-reducing synthesis protocol is opted in this research for fabrication of Ag/CaO nano-composites (NCs) using *Zingiber officinale* as reducing and capping agent. Several techniques are used to examine structural, optical and morphological properties of Ag/CaO NCs, which included XRD, FTIR, UV-Vis, HRTEM and EDS. CaO exhibited a face centered cubic (FCC) structure as determined by XRD. Additionally, the existence of functional groups was verified by FTIR. The absorption spectra of the samples indicated a blue shift with high concentration extract. High agglomeration including extract coating was observed through HR-TEM and EDS confirmed the formation of CaO and AgO. Further, It was ascertained that doped NCs is an effective catalyst against methylene blue and *ciprofloxacin* (MB:CF).