

**A study on influence of superparamagnetic iron oxide nanoparticles (SPIONs) on green gram (*Vigna radiata* L.) and earthworm (*Eudrilus eugeniae* L.)**

ABSTRACT

Nanoparticles usage are now emerging as hazardous nanopollutants due to inappropriate usage and improper disposal. Superparamagnetic Iron Oxide Nanoparticles (SPIONs) is a widely used nanoparticle with various applications. In this study, SPIONs was evaluated for its impact against *Vigna radiata* and *Eudrilus eugeniae*. SPIONs were synthesized by chemical co-precipitation method in presence of cobalt chloride. The produced SPIONs was characterized using UV-Visible Spectroscopy, SEM (Scanning electron microscopy), EDX (Energy dispersive X-ray spectroscopy), XRD (X-ray diffraction), TEM (Transmission electron microscopy), AFM (Atomic force microscopy), XPS (X-ray photoelectron spectroscopy) and Zeta potential. The synthesized SPIONs were crystalline and monodispersed with size ranging between 15 nm and 20 nm. The seedlings of SPIONs treated *Vigna radiata* were found to have reduced root and shoot growth. The bioaccumulation of iron oxide in the treated plants was confirmed by ICP-OES (Inductively coupled plasma - optical emission spectrometry) analysis and Prussian blue staining. Cellular destruction and reduced reproduction rate were found in SPIONs exposed *Eudrilus eugeniae* and ICP-OES analysis of earthworm samples affirmed the bioaccumulation of SPIONs.

**Keyword:** SPIONs; Bioaccumulation; Toxicity; ICP-OES