Chapter 14 - Copper-based nanoparticles in soil: Uptake, bioaccumulation, toxicity, and biotransformation in plants

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Abstract

Over the last few decades, nanotechnology has evolved as an interdisciplinary area, which has attracted great interest. Due to their enhanced physicochemical properties and biological activities compared to their bulk parent materials, production and application of these metal-based nanoparticles (NPs) have increased significantly over these years. These metal-based NPs can enter the environment through both natural and anthropogenic pathways. Among metal NPs, copper-based NPs (Cu-NPs) have attracted greater interest when compared to other metal-based NPs. There is an increasing concern about the release of Cu-based NPs into the environment and the subsequent side effects on ecosystem and human health. Despite the vast researches on Cu and Cu-based NPs, their fate and toxicity to biota are still poorly understood, and it is essential to understand the transport and transformation in plant. This chapter presents an overview of the current studies, and discourse on transport, bioaccumulation, and interaction of Cu-NPs with plant system.