



## Harmful potential toxic elements in greenhouse soils under long-term cultivation in Almería (Spain)

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Heavy metals (HM) are considered highly significant environmental contaminants and are the object of many scientific research works into the soil environment. Activities like agriculture or industry can increase the concentration of these contaminants in soils and waters, which can affect the food chain. Intensification of certain agricultural practices, constant and excessive use of fertilizers and phytosanitary products, and using machinery, increase the HM content in agricultural soils. Many studies have dealt with HM accumulation over time. Despite these works, the influence of long periods of time on these contents, the dynamics and evolution of these elements in agricultural soils, especially soils used for intensive farming purposes under greenhouse conditions, remain unknown to a certain extent. The western Almería region (Spain) is a very important area from both the socio-economic and agricultural viewpoints. A common practice in greenhouse agriculture is the addition of agrochemicals to soils and crops to improve nutrient supply or crop protection and disease control. Such intense agricultural activity has a strong impact, which may have negative repercussions on both these greenhouse soils and the environment. A research has been carried out to determine the total and available levels of six harmful potentially toxic elements (Cd, Cu, Pb, Ni, Zn and Co), and to assess long-term variations in the greenhouse soils of western Almeria. The results indicate that managing soils in the greenhouse preparation stage determines major changes in total and available HM contents. Furthermore, Cd, Cu and Pb enrichment in soil was observed depending on the element and years of growth.