

Studies of Nickel Uptake by Plants Using X-ray Fluorescence Microscopy.

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Mining, alloy production, construction, spillage of petrochemicals, and other industrial activities result in contamination of soil and wastewater with various chemicals and heavy metals, that affect environment and may pose health threat to people through direct ingestion, contact with contaminated soil or water, food chain (soil-plant-human) or reduction of food quality. Heavy metal bioavailability may depend on several factors, including soil composition, humidity, microbial and fungal activity.

In this study, we examined Nickel uptake by different plants, involved in food chain, and its accumulation in roots and leaves. Plants have been grown in agar gel in sterile environment and Ni was introduced 5 and 12 days after germination. Nickel concentrations in fresh roots and dried leaves as well as controls were measured using X-ray Fluorescence (XRF), as one of the most important tools for elemental quantification and mapping in biological and medical samples. Our results show presence of Ni in all incubated samples, which raises a big concern about effect of heavy metal contamination of produce on human health. We plan to use developed plant growing approach and live root preparation protocols to study accumulation of other heavy metals in plants as well as changes in metal speciation and possibly ways to mediate this process.