How Certain Plants Can Stand to Eat Heavy Metals

Metal hyperaccumulating plants like *Thlaspi goesingense* can accumulate high levels of heavy metals in aboveground biomass, thus providing a “green” remediation method for metal-contaminated sites (phytoremediation) and a “green” technology for mining metals of economic value from naturally-enriched soils (phytoremediation), but the mechanisms of metal tolerance remain poorly understood.

By applying a suite of hard X-ray microprobe techniques such as X-ray fluorescence imaging (XRF) and X-ray absorption spectroscopy (XAS), the team discovered that the rudimentary plants contained within T.g. seeds have the ability to compartmentalize nickel into their epidermal cells for long-term storage, which prevents the metal from causing oxidative damage to vital tissues, cells and organelles. XAS measurements on single epidermal cells revealed that Ni is stored as a nickel-sulfur nanocluster.

These measurements are important to help understand the mechanisms of metal tolerance and homeostasis in plants which could be useful for improving phytoremediation/phytomining technologies as well as improving the nutritional content of plants.


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