

Uptake and Cellular Compartmentalization of Metals from the Rhizosphere by Hyperaccumulating Plants: A Real Time Approach Using Confocal Microscopy. (6487)

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Abstract:

An abundance of research in recent years has focused on the mechanisms of heavy metal uptake and compartmentalization in hyperaccumulating plants. Previous attempts to establish the path of metal ingress into plant tissues have suffered from analytical techniques that lack sufficient sensitivity or require extensive sample handling and pretreatment, the latter potentially altering the metal allocation. As such, a real time method for imaging the uptake, and compartmentalization of metals would be an ideal tool for determining the true in-vivo response of plants to heavy metals in the rhizosphere. We first focused on characterizing the species and location of Ni within the rhizosphere and plant using several synchrotron based techniques. We revealed that the metals were complexed primarily with citrate and histidine, located within the dermal and vascular tissues and absent from the ground tissues. Our focus has now turned to determining the mechanism of metal ingress into the plant at the soil root interface. Confocal microscopy together with the novel application of metal specific fluorescent dyes were used to track the ingress of metals into plant roots exposed to metal laden solutions. Preliminary results indicate that it is possible to image the real time movement of metals into and within plant cells.

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