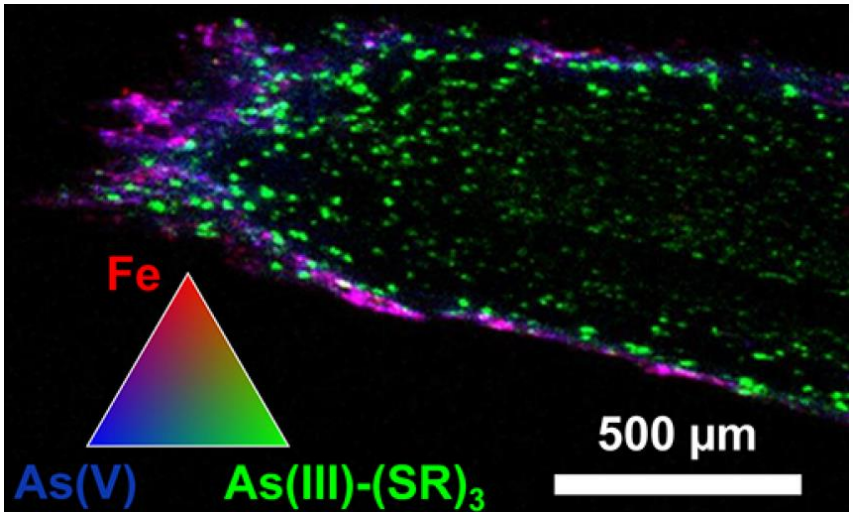
Using Plants to Immobilize and Stabilize Arsenic in the Soil



Microscale x-ray fluorescence imaging of a 30 µm thick P. juliflora root thin section from a plant grown at the IKMHSS tailings amended with 15% compost and lime for one year. The tricolor plot represents an overlay of Fe, As(V), and As(III)−S in a 10:1:1 ratio of intensity scales.

Scientific Achievement

***P. juliflora* plant roots were shown to use a combination of two mechanisms to scavenge and immobilize arsenic from mine tailings.**

Significance and Impact

Phytostabilization can be a cost-effective and long-term bioremediation technique for the detoxification of arsenic-rich soils.

Research Details

- Micro-XANES imaging at NSLS-II and SSRL was used to resolve arsenic, iron, and sulfur spatial distribution and speciation in plant tissues.
- Results revealed two distinct mechanisms of arsenic detoxification via (1) As(V) bound to ferric sulfate plaques on root surfaces and (2) As(III) complexes in root vacuoles.

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