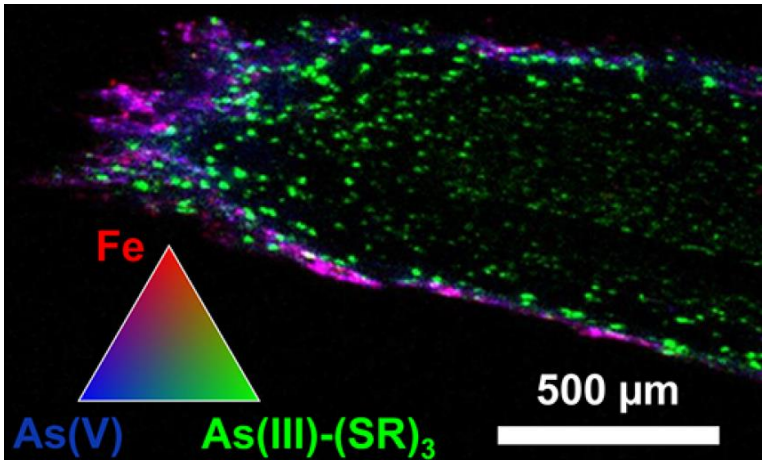
Using Plants to Immobilize and Stabilize Arsenic in the Soil



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. [Reprinted with permission from Hammond et al. 2018. Copyright 2018 American Chemical Society.]

Hammond, C. M., et al. 2018. "Mechanisms of Arsenic Sequestration by *Prosopis juliflora* During the Phytostabilization of Metalliferous Mine Tailing," *Environmental Science & Technology* 52, 1156–64. DOI:10.1021/acs.est.7b04363.

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 mine tailings

Research Details

- Micro-XANES imaging at SSRL and NSLS-II 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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