

Effects of soil texture and soil fertilization on arsenic phytoextraction

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Soil arsenic (As) contamination is a global problem, resulting in part from anthropogenic activities, including mining and the use of arsenical pesticides and treated wood. Phytoextraction using the hyperaccumulating fern *Pteris vittata* is an emerging technology to remediate soils with shallow As contamination with minimal site disturbance. However, many challenges lie ahead for widespread use of phytoextraction. Most research on As phytoextraction with *P. vittata* has examined As removal from sandy soils, with little research focusing on As removal from clayey soils, where As is less phytoavailable. Even in sandy soil, remediation times using *P. vittata* are on the order of decades.

The objective of this study is to determine the effects of soil texture and soil fertilization on As extraction by *P. vittata*, to optimize remediation efficiency and decrease remediation time. In parallel with a field study, a greenhouse study was established with *P. vittata* planted in a historically contaminated sandy loam (176 mg As kg⁻¹) or clay loam (91 mg As kg⁻¹). One of eight treatments was applied to individual ferns. Treatments included fertilization with organic and inorganic fertilizers, compost and inoculation with mycorrhizal fungi. Fronds were sampled monthly for 4 months. Preliminary results one month after treatment show that frond As concentrations were an order of magnitude lower in ferns grown in the clay loam than in the sandy loam, while P and inorganic N treatments lowered fern As concentrations compared to the control in the sandy loam but not clay loam. We will present comparisons of As bioavailability in the two soils pre- and post-fern growth.