Effects of As on Organic acids and P in Xylem Sap of Chinese Brake Fern. (S11-kertulis233352-Oral)

Authors:

- G.M.Kertulis* - *University of Florida*
- L.Q.Ma - *University of Florida*
- G.E.MacDonald - *University of Florida*

Abstract:

Arsenic transport in Chinese brake fern (Pteris vittata L.), an As-hyperaccumulating plant, is one key to understanding the role As plays in this fern. The form in which As is transported in xylem sap and the effects As concentration and forms have on organic acids and phosphorus in the sap were investigated using a hydroponics experiment. Ferns were subjected to 0, 10, and 50 mg L-1 As either as As(III) or As(V). After three days, ferns were harvested and xylem sap samples taken. Xylem sap was analyzed for As concentration, As speciation, P and organic acid concentrations. Ferns treated with 50 mg L-1 As had the highest concentration of As, 75-118 mg L-1, in their xylem sap. Of the As found in the 10 mg L-1 and 50 mg L-1 As(III) and 50 mg L-1 As(V) treatments, 66%, 92% and 84%, respectively, was As(V). However, only 33% of As in the 10 mg L-1 As(V) treatment xylem sap was As(V). Malonic and fumaric acids were highest in sap at 0 mg L-1 As. Tartaric, pyruvic, malonic and fumaric acid concentrations were much lower at the conclusion of the experiment. The predominate form in which As is transported in Chinese brake is +5, which resembles inorganic phosphate. Although exposure to and presence of As in xylem sap reduces some organic acids, As form does not have an effect.

Corresponding Author Information:

Gina Kertulis
University of Florida
130 Eliam Rd.
Melrose, FL 32666

phone: 352-475-9592
e-mail: kertulis@ufl.edu

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