Effect of Cd, Ni, Zn, and Pb on arsenic uptake by brake fern(Pteris vittata) in CCA contaminated soil. (S11fayiga111754-Oral)

Authors:

- A.O.Fayiga* University of Florida
- L.Q.Ma* University of Florida
- X.Cao* University of Florida
- B.Rathinasabapathi* University of Florida

Abstract:

Hyperaccumulating plants need to be tolerant of a wide range of heavy metals. The effects of heavy metals Cd .Ni, Pb and Zn on arsenic hyperaccumulation by Chinese Brake fern (Pteris vittata), was investigated in this experiment. The fern was grown in a greenhouse for 8 weeks in a CCA(chromated copper arsenate) contaminated soil was spiked with Cd,Ni, Pb, and Zn at 50 and 200 mg/kg. Total and/or water-soluble metal concentrations in soil and plant samples were analyzed before and after the experiment (GFAAS). The fern biomass (above and below ground), catalase activity and arsenic speciation (As-III and As-V) in the fern biomass were also determined. Despite the presence of other metals in the soil, the fern was able to take up a large amount of arsenic(up to 4,100 mg kg-1) in its fronds, but little of other metals. Fern biomass increased as much as 12 times the original dry weight in 8 wks (up to 18.9 g per plant). Almost all the arsenic in the plant was present as As-III, indicating little impact of the studied metals on plant arsenic reduction. This study shows that the presence of other heavy metals had limited impacts on plant growth and arsenic uptake and suggests that Chinese Brake fern has great potentials for phytoremediation of arsenic-contaminated soils.

Corresponding Author Information:

Abioye Fayiga University of Florida 2911SW 13th st. # 48 Gainesville, FL 32608 phone: 352- 392- 8662 e-mail:

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