Interactive Effects of As, P and pH on the Growth and the Uptake of As and P in Arsenic Hyperaccumulating Brake Fern. (S11-tu080602-Poster)

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Abstract:

Arsenic polluted sites including groundwater vary with pH and concentration of As and P, but research is limited concerning the interactive effect of pH, As and P on arsenic hyperaccumulating plant, Chinese Brake fern (Pteris vittata L.). In this study, a three-factor, fivelevel experiment with Central Composite Design was employed to study the interactive effect of pH, P and As on the growth of Chinese Brake and its uptake of As and P under hydroponic condition. The treatment levels of pH ranged from 4.5 to 8.0, As from 0 to 0.668 mM, and P from 0 to 1 mM. Arsenic inhibited the plant growth at high concentration (>0.362 mM), whereas low As concentration was beneficial to plant growth. Phosphorus suppressed plant As uptake significantly, however, low As (<0.371mM) increased P uptake due to the beneficial effect of As to plant growth. Although the fern grew well in pH range between 4.5-8.0, better plant growth and arsenic uptake were observed at both low pH low As and high pH high As with a saddle point at pH 6.27 and As 0.358mM. The study demonstrated that the best growth and the greatest arsenic hyperaccumulation could be achieved by maintaining the P concentration to a minimum (<0.576mM) with pH adjustment dictated by As levels in the growth media.

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