Uptake and translocation of arsenite and arsenate by *Pteris vittata* L.: effects of glycerol, antimonite and silver

Abstract. The arsenic hyper-accumulator *Pteris vittata* can accumulate both arsenate (AsV) and arsenite (AsIII) by unique transporter systems. AsV uptake by *P. vittata* is known to be by a phosphate transporter system since AsV and phosphates are analogs. AsIII uptake in living cells is mainly though aquaglyceroporin transporters, however, it is unclear if this is the case with *P. vittata*. We investigated the effects of 1) AsIII analogs glycerol and antimonite (SbIII) at concentrations of 0, 0.1, 1, 10, and 100 mM, and 2) an aquaporin inhibitor silver nitrate at concentrations of 0, 0.001, 0.01 and 0.1 mM on the uptake of 0.1 mM AsIII or AsV by *P. vittata* over 1h. The presence of glycerol or SbIII had no impact on AsIII or AsV uptake by *P. vittata* ($p<0.05$), with As concentrations in the fronds and roots being 4.4-6.3 and 3.9-6.2 mg/kg respectively. However, 0.1 mM $AgNO_3$ reduced As concentrations in the fronds and roots by 64% and 58%. This aquaporin inhibition mediated reduction in AsIII uptake indicates that AsIII uptake is via an aquaporin transporter different from the glycerol and antimonite transporters. Further, the AsIII analogs and the aquaporin inhibitor had no impact on AsV uptake confirming that AsIII and AsV might be taken up by different transporters.

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