Arsenic and antimony lability in recently and historically contaminated soils and its effects on water spinach (*Ipomoea aquatic)*

LAKMINI P. A†*, GABRIELLA MACOUSTRA†, LIEN NGO† AND DIANNE F. JOLLEY†

† School of Chemistry, University of Wollongong, NSW 2522, Australia (*Correspondance: lpe346@uowmail.edu.au)

INTRODUCTION

The Sb toxicity mechanism and the competition with As on plant uptake is still imprecise. In this study our intention was to measure the lability of As and Sb from soil treatments of different ages (recently and historically contaminated) as labile metal fractions in the soils decrease over the time [1].The phytotoxicity of As and Sb exposure (35 d) from these treatments on the *Ipomoea aquatica* was identified by using root and shoot growth (biomass and length) and photosynthetic efficiency. The bioavailable As and Sb was determined by Sequential Extraction Procedure (SEP) [2] and compared to total metal concentrations in assayed soil and tissue bioaccumulation.

DISCUSSION OF RESULTS

The percentage lability of both As and Sb increases with SEP-total extractable soil metal concentrations and to a greater extent in recently contaminated than in historically contaminated soils. Overall in both soil treatments As showed higher lability than Sb.

Roots were more tolerant than shoots to total soil concentrations of Sb (biomass and length) and As (biomass) with greater toxicity for As (biomass and length) in historically contaminated soils, and Sb (biomass) in recently contaminated soils. When labile As and Sb were measured in both soil treatments, Sb was found to be more toxic than As, with greater growth inhibition in shoots than roots in historically contaminated soils. A poor relationship was observed for roots in recently contaminated soils with both total and bioavailable metal fractions. *I.aquatic* shoot elongation showed higher tolerance to bioavailable Sb than As whereas labile Sb had more toxicity on shoot biomass in recently contaminated soils. The lower EC values for recently contaminated soils also suggest that toxicity in recently contaminated soils more significant than aged soils. As and Sb accumulation into the edible parts of water spinach showed higher As accumulation in both soil treatments.

[1]Wang et al (2015) Environ pollut, 207, 79-87. [2] Wenzel et al (2001) Anal Chim acta, 436, 309-323.