

# RESEARCH DIRECTIONS

## Interaction in Soils

**Associate Professor Paul Holford and Dr Paul Milham from the Centre for Plants and the Environment, together with NSW Department of Investment and Industry and Applied Horticultural Research Pty. Ltd., have been awarded a UWS Research Partnership grant to develop a simple method to measure bioavailable cadmium in soils.**

'Plants are the principal point of cadmium (Cd) entry to the human food chain, and cadmium in plant foods causes chronic cadmium intoxication,' says Associate Professor Holford. 'The health risks include irreversible kidney damage, osteoporosis, cancer, pulmonary fibrosis and emphysema. We will test the hypothesis that halide ions interact specifically with bioavailable cadmium in soil allowing the prediction of plant uptake of this heavy metal pollutant. The current measure of bioavailable soil Cd relies on isotopic techniques, which are technically complex and expensive. Our project will develop new knowledge of cadmium-halide interaction in soils. Proof of the hypothesis would allow the exploration of cadmium binding sites in soils and the development of a simple, novel measure of bioavailable soil cadmium for inclusion in predictive models of cadmium uptake by plants.'

Bioavailable cadmium in the Sydney soils will be tested and the ratio of bioavailable to non-bioavailable cadmium will be determined. This ratio enables the size of the pool of bioavailable cadmium to be estimated and deviations from a set ratio indicate the extraction of non-bioavailable cadmium from the soil. The research team will examine the halide-Cd-pH interaction in detail across the pH range 4.0–7.0. Analysis of variance and multiple regression modelling will be used to evaluate the relationship between bioavailable cadmium, pH and chloride to iodide ratio.



The results will underpin strategies to restrict cadmium uptake by plants and its consequent entry into the human food chain. These developments will benefit the health of the Australian community, and in the passage of time, those benefits will extend beyond Australia. There will also be economic benefits to Australian trade for our wheat exports by maintaining market access.

**Project Title:** How Specific is the Interaction of Halide Ions and Bioavailable Soil Cadmium?

**Funding has been set at:** \$10,000

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<http://www.uws.edu.au/cpe>

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**For more information on UWS Research Partnership Program, check:**

[http://www.uws.edu.au/research/researchers/funding\\_opportunities/internal\\_research\\_grants](http://www.uws.edu.au/research/researchers/funding_opportunities/internal_research_grants)