

Dr Richard Collins

BSc(Hons) (1996), PhD (2002) The University of Adelaide

Senior Research Associate, Centre for Water and Waste Technology, UNSW (since May 2005)

Employment History

Research Engineer	French Atomic Energy Commission, France	2002 - 2005
Analytical Chemist	ZENECA Ag Products, USA	1997 - 1999

Expertise

Dr Collins has considerable expertise in the environmental fate, speciation and bioavailability of metals (Al, Cd, Co, Cu, Fe, Mn, Ni, and Zn), metalloids (Se) and actinides (Am and U) in aquatic and terrestrial systems. His particular areas of specialization include the:

- Application and development of novel isotope exchange techniques to determine the fate, speciation and potential bioavailability of trace elements in soils.
- Development of HPLC methodology for quantifying aqueous trace element speciation, including elucidation of the thermodynamic and kinetic constraints of these techniques.
- Utilization of other various analytical techniques to determine the chemical speciation of trace elements in the aqueous (Donnan dialysis, competitive chelation, chemical speciation programs (GEOCHEM, JCHESS, MINTEQ), etc.) and solid (XRD, XANES and EXAFS spectroscopy) phase.

Richard has also conducted research examining elemental compartmentalization in biological matrices (plants and bacteria) with μ -Proton Induced X-ray Emission spectroscopy, Scanning Electron Microscopy - Energy Dispersive Spectroscopy as well as with isotope exchange and sequential extraction methodologies. Currently he is working on an ARC funded linkage project that aims to characterize and model the physical and chemical properties controlling the transport of Al and Fe from acid sulfate soils to coastal waters in northern NSW.

Selected Publications

- 1) Collins RN, ND Tran, E Bakkaus, L Avoscan and B Gouget (2006) Assessment of isotope exchange methodology to determine the sorption coefficient (K_d) and isotopically exchangeable concentration (E value) of selenium in soils and sediments. *Environ. Sci. Technol.* (accepted 09/2006).
- 2) Bakkaus E, RN Collins, JL Morel and B Gouget (2006) Anion exchange liquid chromatography-inductively coupled plasma-mass spectrometry detection of the Co^{2+} , Cu^{2+} , Fe^{3+} and Ni^{2+} complexes of mugineic and deoxymugineic acid. *J. Chromatogr. A* 1129(2): 208-215.
- 3) Avoscan L, R Collins, M Carrière, B Gouget and J Covès (2006) Seleno-L-methionine is the predominant organic form of selenium in *Cupriavidus metallidurans* CH34 exposed to selenite or selenate. *Appl. Environ. Microbiol.* 72: 6414-6416.
- 4) Bion L, E Ansoborlo, V Moulin, P Reiller, R Collins, R Gilbin, L Février, T Perrier, F Denison and G Cote (2005) Influence of thermodynamic database on the modelisation of americium(III) speciation in a simulated biological medium. *Radiochim. Acta* 93(11): 715-718.
- 5) Gouget B, L Avoscan, G Sarret, R Collins and M Carrière (2005) Resistance, accumulation and transformation of selenium by the cyanobacterium *Synechocystis* sp. PCC 6803 after exposure to inorganic Se^{IV} or Se^{VI} . *Radiochim. Acta* 93(11): 683-690.
- 6) Collins RN (2004) Separation of low-molecular mass organic acid-metal complexes by high-performance liquid chromatography. *J. Chromatogr. A* 1059(1-2): 1-12.
- 7) Carrière M, L Avoscan, R Collins, F Carrot, H Khodja, E Ansoborlo and B Gouget (2004) Influence of uranium speciation on normal rat kidney (NRK-52E) proximal cell cytotoxicity. *Chem. Res. Toxicol.* 17: 446-452.
- 8) Collins RN, G Merrington, MJ McLaughlin and JL Morel (2003) Transformation and fixation of Zn in two polluted soils by changes of pH and organic ligands. *Aust. J. Soil Res.* 41(5): 905-917.
- 9) Collins RN, G Merrington, MJ McLaughlin and JL Morel (2003) Organic ligand and pH effects on isotopically exchangeable Cd in polluted soils. *Soil Sci. Soc. Am. J.* 67(1): 112-121.

Publications over last 5 years

Peer-reviewed research publications: 22

Conference publications: 17