Foreword

Soil contamination is a major barrier to the redevelopment of many former industrial sites in inner cities. High concentrations of contaminants such as lead, cadmium, arsenic, nickel and polycyclic aromatic hydrocarbons (PAH) are often found at these “brown sites”. Furthermore, naturally occurring high concentrations of elements such as arsenic and cadmium over wide areas may restrict the use of land for both residential and recreational purposes.

In the field of human health risk assessment, oral exposure to contaminants is the primary pathway of interest, specifically for small children who may ingest considerable amounts of soil via hand-to-mouth contact and *pica* behaviour.

At present, the risks associated with soil ingestion are estimated based upon the total contaminant content of soils. However, only a fraction, of the many contaminants in soil, is usually taken up into the human body and it appears that risk estimates based on total concentration of contaminant result in overestimation of the risk. Many sites across Europe will accordingly be falsely classified as contaminated and remediated resulting in excessive costs. A more practical approach to this problem requires access to accepted, robust and economically feasible methods that can account for the difference between the total and the bioavailable soil contaminant concentrations, thereby making risk assessment more accurate but still protective for human health.

Bioavailability of soil contaminants is investigated *in vivo* with experimental animals with the associated high costs and ethical concerns. Recently, efforts have therefore been directed towards developing and validating *in vitro* test systems that through simulation of the dissolution of soil contaminants in the human gastrointestinal system (the bioaccessibility) can be used to estimate the risk associated with oral exposure contaminated soil. As for ecosystem bioavailability, reduced human, oral bioavailability and bioaccessibility means reduced toxicity of a contaminated soil.

In 1999 research groups across Europe formed the BARGE (BioAccessibility Research Group Europe) with the purpose of developing and validating *in vitro* methods for estimation of soil contaminant bioavailability. This special issue on *bioaccessibility of soil contaminants* describes the current state of the art for these *in vitro* methods. In addition to papers prepared for this special issue, it contains a number of full papers that were presented in a special BARGE session at the 2005 ConSoil conference in Bordeaux, France.

The editors of the special issue thank all the contributors and reviewers for their efforts and we hope that this collection of papers on the issue of soil contaminant bioaccessibility will encourage further research in the area as well as application of the principles in practical soil risk assessment.

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Guest editors