science summary

Environment Agency

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Questionnaire Survey on the Use of *In-vitro* Bioaccessibility in Human Health Risk Assessment
Science Summary SC040060

The Environment Agency has discovered that bioaccessibility test data are regularly being submitted to local authorities as part of risk assessments for land contamination. In a survey of contaminated land officers at English and Welsh local authorities, the Environment Agency found that half of them had received bioaccessibility data, which was accepted on most occasions.

Bioaccessibility data are derived from laboratory experiments that attempt to mimic the human uptake of chemical contaminants from the soil. The limitations of this in vitro approach led the Environment Agency to conclude in 2005 that it could not recommend the use of bioaccessibility testing. Nevertheless, the Environment Agency became aware that such tests were being used in the UK.

To find out the extent of this use, the Environment Agency sent a questionnaire to all 375 local and unitary authorities in England and Wales. The purpose of this questionnaire was to illicit information on:

- the use of bioaccessibility testing of soils for heavy metals in England and Wales;
- local authorities' experiences and views on the acceptability of the results of such tests in the risk management of land contamination.

The Environment Agency received responses from approximately a quarter of the authorities and the survey revealed a number of important findings.

- Ninety per cent of participants reported having sites with high levels of heavy metals in their areas.
- The overwhelming majority of participants indicated arsenic as the main metal contaminant of concern, followed by lead, nickel and cadmium.
- The source of this metal contamination was attributed equally to natural background sources and anthropogenic activities.
- Of the participants in this survey, half of them had received bioaccessibility data and/or estimates as part of their regulatory duties with respect to land contamination. All the participants that had received such data had received it for arsenic,
- while around a quarter of participants had received bioaccessibility data for lead and nickel.
- Of those that had received bioaccessibility data, 85.7 per cent had at some time accepted it when provided as part of risk assessments. Arsenic was the main contaminant for which participants accepted bioaccessibility data.
- Those rejecting bioaccessibility data did so either on the basis of a lack of centralised guidance on its use or due to poor use of the data within the risk assessments.
- Most participants had only occasionally received measurements or estimates of oral bioaccessibility in the past two years, but about half reported that the use of bioaccessibility testing was increasing.

The results of the survey form part of the Environment Agency's science programme on bioaccessibility testing of soils, which will inform any potential future policy in this area. This report should be of interest to local and unitary authorities, environmental consultancies and anyone involved in the management of risks to human health from land contamination.

This summary relates to information from Science Project SC040060. The project also involved a ring test to assess the bioaccessibility tests/methods provided by the contract laboratories and the intra- and inter-variability of the test results. This ring test was conducted in conjunction with laboratories from the United States and the Netherlands, and the results are reported in detail in the following outputs:

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