THE ROLE OF BIOAVAILABILITY IN CONTAMINANT ASSESSMENT

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Reliable evaluation of the potential hazard to target populations from exposure to contaminants in the environment depends, in part, on accurate information on the rate and extent of absorption from each exposure medium. This is especially true for soil, since contaminants in soil can exist in a variety of different forms and particle types, some of which tend to have low absorbability. Thus, equal ingested doses of different forms of a chemical in soil may not be of equal health concern. Bioavailability, the gold standard adopted by the drug industry a century ago, is used to calculate dosages for non-intravenous routes of administration. Similarly, bioavailability of soil contaminants has now found an important role in risk assessment and remedial decision making processes. For example, results from 19 different test materials contaminated with lead encompass a wide range of relative bioavailability (RBA) values, from 6% to 105%. This variability in RBA between different samples highlights the importance of reliable RBA data to help improve risk assessment of contaminants in soil. Although the RBA value for a sample contaminant depends on the associated matrix and the physical/chemical forms present, data are not yet adequate for the vast majority of contaminants to allow reliable quantitative predictions of RBA from physical/chemical speciation data alone. Just as bioavailability studies are required for every new drug formulation in the marketplace, so too, will bioavailability estimates be required for every new contaminant under consideration.