

book. Laboratories and individuals experienced in conducting bioavailability studies of the type discussed in the book also are identified.

The book has the following eight chapters:

1. Overview
2. Designing/Conducting a Bioavailability Study
3. Arsenic
4. Cadmium
5. Chromium
6. Lead
7. Mercury
8. Nickel

Each chapter follows the same format: Predominant forms in the soil, Toxicity assessment, Summary of relative bioavailability data, In vitro study design recommendations, In vivo study design recommendations and References. There are two appendices describing methods for the determination of the bioavailability of lead and arsenic.

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Human and Ecological Risk Assessment: Theory and Practice

Dennis J. Paustenbach (Ed.), Wiley, New York, NY, 2002, US\$ 150.00, 1586 pp., ISBN 0-471-14747-8

To begin my review, I quote from the foreword written by William K. Riley, former administrator of the US EPA:

When Dr. Paustenbach's previous text was published in 1989, it filled an important void in the environmental sciences. Before that time, risk assessments were usually conducted by regulatory agencies or those within the regulated community (and their consultants) and were of varying quality. Most of these assessments lacked transparency, that is, few persons knew exactly how the calculations were performed and the basis for the exposure factors and other assumptions. Further, only a few assessments had been published in peer-reviewed journals before 1990 and this tended to inhibit the maturation of the scientific aspects of risk assessment. Thus, his textbook of case studies became a foundation against which others could assess the thoroughness of their work.

This new text comes at a time when the field has passed through its infancy and is now a generally well-respected approach for objectively evaluating environmental issues. Many well-known and respected authors have contributed to this text and have described methods that they have used to evaluate complex environmental questions. Appropriately, an emphasis has been placed on presenting analyses that address topics ranging from risks due to contaminated groundwater, occupational hazards, radionuclide emissions to the community, consumer products, and a variety of risks to wildlife. The overall

quality of the text, with the emphasis on providing transparency in the calculations, the quantitative description of uncertainty in the risk estimates, and the importance of proper risk characterization should help ensure that better quality risk assessments are conducted in the coming years. Students and practitioners will benefit significantly from the work of Dr. Paustenbach and his colleagues.

Indeed they should. Dr. Paustenbach has, in my opinion, a comprehensive and authoritative text on risk assessment (I must note, however, that although I have an interest in risk analysis, that is not my major area of expertise).

The production and use of chemicals has markedly improved the quality of life and standard of living. However, chemical production, storage, shipping, and use are not without risk. Negative impacts to public health and the environment have occurred due to chemical spills, misuse, and improper disposal. But when are we safe and how safe is safe? This book addresses those questions.

Over the past 25 years, the editor notes, risk assessment has evolved considerably with the publication of more than 200 risk assessments in the peer-reviewed literature. Additionally, he notes, there are now five peer-reviewed journals that focus on the topic of risk assessment.

Paustenbach wrote in his preface:

The purpose of this text, which presents both theory and practice, is to provide the scientific community with an up-to-date single source of information about how to conduct human and ecological risk assessments. The diversity of subjects addressed and the specific cases were intended to share with the reader many of the changes and improvements in the practice of risk assessment that have occurred over the past decade.

The chapters in this book are presented in such a way that the text can be used in graduate level courses, or can serve as a daily reference for practitioners. The first section addresses the basic components of a human health assessment: hazard identification, dose–response assessment, exposure assessment, and risk characterization. The second section deals with the same components, but as they relate to ecological risk assessment Most of the remaining sections present various case studies that address some of the common environmental and occupational health challenges that scientists must face over the next 10–15 years.

The book has 32 chapters organized under the following major headings:

- A. Human Health Assessment
- B. Theory: Ecological Risk Assessment
- C. Case Studies Involving Contaminated Water
- D. Case Study Involving Contaminated Soils
- E. Characterizing Exposure to Air Contaminants
- F. Evaluating Occupational Hazards
- G. Case Study Involving Exposure to Radionuclides
- H. Evaluating Risk to Foods
- I. Assessing Risks Associated with Consumer Products
- J. Case Studies in Ecological Risk Assessment
- K. Assessing Risk to Birds

- L. Risk Assessment in Life-Cycle Analysis
- M. Risk Communication and Risk Management
- N. Evolving Issues

The book is indeed comprehensive, covering the topic of risk assessment from a discussion of risk in 3200 B.C. to the present. More than 60 scientists contributed to the book, citing over 4000 references. Completeness is the key word to describe this text.

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