Introduction

The assessment of the fate and effect of xenobiotic chemicals in the environment has evolved over the past several years into three categories: (1) assessment of the effects of a contaminant at the organism level in standardized acute and chronic tests; (2) assessment of contaminants at the population, community, and ecosystem level using laboratory microcosms; and (3) assessment of environmental exposure and fate of contaminants using mathematical modeling techniques. There have been increasing expressions of need among managers, decision makers, and scientists to validate and establish the limits of predictability of these assessment procedures.

The term *validate*, in the sense of this volume, means establishing the effectiveness of an assessment procedure by substantiating the degree of accuracy. This implies formulation of procedures for comparison of laboratory and field generated data. The term *predictability* implies determining the ability to forecast from laboratory results to what could be expected in a real-world situation. This involves specific advice to users of laboratory data as to the level of confidence and limits of extrapolation.

Establishing the validity and determination of the predictability of assessment procedures must depend on specific sets of hypotheses that both qualify and quantify: (1) the set of environmental variables that are critical in determining differences in exposures and response of organisms to a chemical in laboratory and field, (2) the magnitude of potential indirect effects, and (3) the relative sensitivity of organisms in the laboratory and field.

This volume presents an array of diverse research efforts toward resolving important questions on the status of determining the validity and predictability of current methods of environmental hazard assessment and research.

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