

PROGRESS IN ASSESSING THE FATE AND EXPOSURE OF PRIORITY ORGANIC CONTAMINANTS: THE ROLE OF MASS BALANCE MODELS

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Introduction

Whereas it is widely accepted that a small group of 10 to 20 persistent, bioaccumulative, and toxic substances such as the dioxins, DDT, and PCBs require international regulation and preferably a global ban, it is less clear how many more substances should be added to this list. A sound scientific basis for making such decisions is presently lacking. In this study the role which can be played by mass balance models in classifying substances and assigning priority is reviewed and suggestions are made for a practical multi-tiered approach.

Methods

The key attributes of candidate chemicals are discussed from which it is concluded that overall persistence(1), bioaccumulation potential and susceptibility to long range transport are the important intrinsic properties which influence environmental fate and exposure. It is suggested that these attributes be examined first, with separate consideration of toxicity and risk. Models are described which can assist in quantifying these attributes and thus assigning priorities.

Results and Discussion

A group of over 200 substances has been selected and properties obtained largely from the CD ROM database by Mackay et al. (2). The distributions of partitioning and reactivity properties are described. This group has been tested using the suggested models and the results evaluated with a view to ensuring that no chemicals of concern escape classification as having "high priority", while retaining relatively modest demands for information on properties and usage. A tentative system for evaluating chemicals is suggested and its strengths and weaknesses are discussed.

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References

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