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Publisher *Taylor & Francis*

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## Chemistry and Ecology

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713455114>

### Organotin-Environmental Fate and Effects

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**To cite this Article** Howells, Gwyneth(1997) 'Organotin-Environmental Fate and Effects', *Chemistry and Ecology*, 14: 1, 79 – 80

**To link to this Article:** DOI: 10.1080/02757549708035541

**URL:** <http://dx.doi.org/10.1080/02757549708035541>

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## Book Review

Organotin-Environmental Fate and Effects, edited by M. C. Champ and O. F. Seligman. Published September 1996, Chapman and Hall, London etc., price £195.00, pages 623 ISBN HB 412 582406. Index, list of acronyms, tables and figures.

This massive book provides a detailed account of work done over the last few years, following the identification of “tributyl” tin as a trace organic metal and where its products were shown to be effective in showing effects on marine organisms. There were symposia on organotin in 1986 and 1987, and in the later symposium at Malta in 1992. This last meeting was the first major attempt to assess the use of TBT in the marine inshore environment, and to derive a cost-benefit structure. The introduction in the book gave Dr. A. R. D. Stebbing an also fitting tribute to the loss of Geoffrey Bryan at the Plymouth Marine Laboratory, a scientist who gave much insight into the problems of TBT in marine molluscs and stimulated much research into research in France and in North America.

Aside from this introduction, the papers are designed to cover the history of its use, legal requirements of use, methods used in identification of TBT, effects on marine fauna and where damage is identified. There is also a final chapter on research information on its environmental fate and effects of organotin. The legal requirements on inshore vessels are set out (where the countries accept them), along with specific requirements of their use. The formation of organic derivatives on tin is demonstrated as an important value to its confirmation as TBT provides a self-cleaning system, washing off into the medium as its effect develops.

Useful methods for identifying organotin included AAS, chromatography, Gruignard reactions, levels in sediments and tissues. The acute effects on freshwater and marine animals show that *Hydra* is the most sensitive species, but the effects on *Cyclops* is much more important.

The effects on oysters and marine annelids are within a wide range of sensitivity, and show that low exposure to  $1 \mu\text{g l}^{-1}$  is a problem in the nearshore environment for annelids and molluscs. The following chapters show that effects on species where tributyl tin influences various hepatic, intestinal and kidney tissues. Chapters include the effects of general effects of tributyl tin on aquatic biota, including metabolism, chronic toxicity, shell thickening in *Crassostrea*, embryonic and larval development of *Crassostrea*, reproductive failure of *Nucella*, flow-through bioassay studies, mussels and other organisms as bioindicators, concentration in sediments and effects on benthic animals.

The sites contaminated with TBT are the final section of the book, with study of persistence and fate in sediment behaviour and sorption, and conditions in different affected areas. A final chapter on research needs suggest that even if 50% reduction is involved in concentrations in near-shore areas, this leaves us still with a high level of insufficiency in the reaction of sensitive species are to TBT. Overall, the problems would need to be tackled by identifying and quantifying exposure pathways and mechanisms of toxicity, and in particular the role of sediments and suspended materials in water, to define the processes, rates and mechanisms of decay, define and expand the key environmental variables that control degradation, identify the toxic mechanisms and to identify reference material to allow intercalibration.

The conclusion and compelling need for TBT control and recovery is exemplified in this book. The massive effort in USA and some European nations is countered by many other nations which are able to use TBT in ocean-going ships; these are able to pollute inshore areas, confounding the problem. The book itself is an effort to recognizing the understanding of the TBT problem and its possible solutions. Unfortunately the book is only found for larger libraries, and seldom in most research faculties. It is worthwhile remembering that this material is one that needs to be tackled by IMO or other agencies to provide a worldwide reaction. However, it does bring the current level of work on TBT to a good end and the book will add much information to workers in the field. I hope that it is a book already on shelves of some laboratories.

Gwyneth Howells,  
Cambridge,  
15 January 1997