AQUATIC TOXICOLOGY AND HAZARD ASSESSMENT: EIGHTH SYMPOSIUM

A symposium sponsored by
ASTM Committee E-47 on
Biological Effects and
Environmental Fate
Fort Mitchell, KY, 15–17 April 198

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Foreword

The Eighth Symposium on Aquatic Toxicology was presented at Fort Mitchell, KY, on 15–17 April 1984. The symposium was sponsored by ASTM Committee E-47 on Biological Effects and Environmental Fate. Rita Comotto Bahner, Association of Official Analytical Chemists, and David J. Hansen, U.S. Environmental Protection Agency, served as chairmen of the symposium and as editors of this publication.

Related ASTM Publications

Aquatic Toxicology and Hazard Assessment: Seventh Symposium, STP 854 (1985), 04-854000-16

Aquatic Toxicology and Hazard Assessment: Sixth Symposium, STP 802 (1983), 04-802000-16

Aquatic Toxicology and Hazard Assessment (Fifth Conference), STP 766 (1982), 04-766000-16

Aquatic Toxicology and Hazard Assessment (4th Conference), STP 737 (1981), 04-737000-16

Aquatic Toxicology (3rd Conference), STP 707 (1980), 04-707000-16

Aquatic Toxicology (2nd Conference), STP 667 (1979), 04-667000-16

Aquatic Toxicology and Hazard Evaluation (1st Conference), STP 634 (1977), 04-634000-16

A Note of Appreciation to Reviewers

The quality of the papers that appear in this publication reflects not only the obvious efforts of the authors but also the unheralded, though essential, work of the reviewers. On behalf of ASTM we acknowledge with appreciation their dedication to high professional standards and their sacrifice of time and effort.

ASTM Committee on Publications

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CORRELATIONS OF LABORATORY AND FIELD DATA

AQUATIC TOXICOLOGY CONCEPTS, INCLUDING TIME/TOXICITY CONCENTRATION PREDICTION TECHNIQUES

Introduction

ASTM is a voluntary consensus standards development organization. As such, most of the previous seven aquatic toxicology and hazard assessment symposia have focused on presentations relating to research aimed, directly or indirectly, at test methods development. The focus of this Eighth Symposium on Aquatic Toxicology is the utility of these methods in the regulatory and industrial context, their limits of environmental applicability and a continued discussion of improvements in the methods.

Quite often in the protective womb of our own laboratories, we forget to consider the ultimate use of the method we are developing. We often focus on research in the narrow context of our specific area of expertise. The intent of this symposium is to open our perspectives to the broader context of use of our individual efforts to develop safer products or to regulate product use to ensure that we protect our environment.

In attempting to define more clearly how our research is used, we built the foci of the sessions in pyramid fashion. The symposium begins by examining how scientific data are used and interpreted by the U.S. Congress and by the European Community, a very broad base, possibly the ultimate end use of the fruits of our labors.

The second session examines specific legislative mandates in the United States and the use of our particular scientific disciplines in decision-making. Although only one paper on the Clean Water Act is included in this edition, several others were discussed at the conference itself: the Maine Protection Research and Sanctuaries Act; the Toxic Substances Control Act; the Federal Insecticide, Fungicide, and Rodenticide Act; the Resources Conservation and Recovery Act; and the Comprehensive Environmental Response, Compensation, and Liabilities Act. Each of these regulations requires data generated and interpreted by scientists to achieve specific goals such as "fishable, swimable waters," "balanced indigenous populations," and so forth, more than the pipedreams of Congress.

The third session of this eighth symposium features a debate about articulating more clearly what must be protected to achieve these environmental goals. The papers featured here focus on an examination of the role of single-

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species, microcosm and system level responses in decision-making. The goal of all panel members was clearly the protection of aquatic life.

Our pyramid progressively narrows from continents and countries, to laws, to identifing what we are trying to protect. The fourth session on research needs responds to the goals outlined in previous papers. In the environmental sciences, knowledge is rarely sufficient and gaps in knowledge are many. Panelists discuss what is needed to fill some of those gaps. Those identified were assessments of sorption to sediments, effluent impacts, rapid determinants of chronic toxicity, translation of laboratory data to the field, the use of multispecies tests, and structure/activity relationships as effect indicators.

The last three sessions discuss on-going research to address some needs described above. We are indeed filling those gaps now. It would be wonderful to be able to accurately predict ecological implications of our acts instead of reacting to environmental consequences of underestimating hazard or economic costs associated with overestimation. Hopefully, the research described here will continue to improve our predictions or lead us to new research areas to make our goal a reality.

The fifth session seeks to answer the following questions: How well does laboratory data predict what really happens in the environment? Can or should we use laboratory data to develop water quality criteria or predict environmental hazard, and so forth? It is obvious that the answers are not simple.

The largest session of this symposium deals with new concepts and methods in aquatic toxicology. These range from biochemical tests, such as the use of a lipid index for predicting bio-uptake by daphnids, to interlaboratory studies of the variability of bioconcentration tests with one species, the eastern oyster.

Our last session reaches the narrowest point of the pyramid. The papers are focused on a single chemical class, dioxins. This session was especially timely because of the Times Beach, MO, incident. This session again points to the need for low-level detection of various chemical species of this material. The research involved not only the regulator, but also the manufacturer. Presentations describe the intensity of effort being expended to this single class of compounds. In the past, similar efforts have gone into a variety of pesticides, metals and polychlorinated biphenyl (PCBs), as well as some less hazardous materials such as detergents and dredged materials.

Thus the pyramid is complete, from its base in national and international arenas to its apex in a single chemical class. By means of these sessions, we hoped to address the question of the use of our scientific achievements. We recognize it is just a modest beginning and that not all blocks that constitute the pyramid are in place, but we hope we have provided the audience with both relevant information and questions to be addressed by future aquatic toxicology symposia.

We, the symposium chairmen, are especially indebted to our session chairmen Dr. Tudor Davies, Dr. Charles Coutant, Dr. Kenneth Dickson, Dr. James Fava, Mr. Scott Sautter, and Dr. William Adams for assisting us in

developing and convening the sessions; to Ms. Anne McKlindon for arranging for symposium facilities; and to Ms. Kathy Greene and the ASTM staff for supervising the publication of this volume.

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Keynote Addresses

Congressman Richard Durbin[1]

Scientific Considerations in the Legislative Arena

REFERENCE: Durbin, R., **"Scientific Considerations in the Legislative Arena,"** *Aquatic Toxicology and Hazard Assessment: Eighth Symposium, ASTM STP 891,* R. C. Bahner and D. J. Hansen, Eds., American Society for Testing and Materials, Philadelphia, 1985, pp. 7-14.

KEY WORDS: toxicology, aquatic biology, standards, law (jurisprudence)

I am very happy to talk about a subject that I have become a lot more familiar with over the past year and a half since I entered Congress, the role that scientific information plays in political decision-making.

As a member of the House Science and Technology Committee, I have had more direct experience with scientific input than some of my colleagues who serve on other committees. My experiences on the Committee have also given me insight into the chasm between the world of politicians and the world of scientists as we both go about doing our jobs.

To give you one small example of the differences between our two worlds, before serving in Congress, I had never heard of the words "quark," "picoseconds," or "meta-atom," or several other very scientific words that came up during testimony before the Science and Technology Committee this past year.

Taking a look at my background and the backgrounds of my colleagues may give you an idea of the differences in perspective between politicians and scientists. Of the 435 members of the House, 199, including myself, are lawyers. However, only eight have technical backgrounds, three in aeronautics and five in engineering. Despite this dearth of scientific background, Congress has the responsibility of directing billions of dollars to civil and defense research projects and making hard choices between fiercely competing projects.

[1]U.S. Congressman, House of Representatives, Washington, DC 20515.

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