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Preface of Pesticide Transformation Products Fate and Significance in the Environment

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Preface of Pesticide Transformation Products Fate and Significance in the Environment

Abstract

PESTICIDES HAVE BECOME an integral part of intensive agriculture. This has resulted in extensive research on the biological efficacy and environmental fate of pesticides. One area of significant interest is the transformation of pesticides in the environment. The mechanisms of pesticide degradation and the products formed from various physical, chemical and biological processes have been well documented. For most currently used pesticides, however, the fate and significance of their transformation products are yet to be elucidated.

Disciplines

Entomology | Food Chemistry | Plant Biology | Plant Breeding and Genetics

Comments

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Preface

PESTICIDES HAVE BECOME an integral part of intensive agriculture. This has resulted in extensive research on the biological efficacy and environmental fate of pesticides. One area of significant interest is the transformation of pesticides in the environment. The mechanisms of pesticide degradation and the products formed from various physical, chemical and biological processes have been well documented. For most currently used pesticides, however, the fate and significance of their transformation products are yet to be elucidated.

Pesticide transformation, in general, is a detoxification process resulting in inert products. Some transformation products, however, have the potential to control target pests, affect nontarget species, and contaminate environmental resources. An extensive body of literature exists on transformation products such as DDE, heptachlor epoxide, 2,4-dichlorophenol, and ethylenethiourea. Some types of information on transformation products, generated by the chemical industry, are proprietary in nature and are not currently available to the scientific community. Little is known about transformation products of the vast majority of the more than 600 active ingredients used in crop protection, however.

Although numerous books have been published on pesticides, this is the first book on pesticide transformation products. Overviews of the current understanding of the pesticide degradation mechanisms and products are discussed in the first two chapters. The remaining chapters are organized into two sections, the first section focusing on the fate of transformation products in the physical and biological environment, and the second addressing their significance in crop protection, environmental contamination, nontarget effects, and legal implications. Overall, the book presents the benefits and risks associated with pesticide transformation products. Inevitably, some of the viewpoints in the book are controversial, but we consider that to be beneficial for the promotion of concepts and approaches to the study of pesticide transformation products.

A tradition of research on pesticide metabolism was established at Iowa State University by Paul A. Dahm, Distinguished Professor in the Department of Entomology and many of his graduate students. Dr. Dahm was a pioneer in the field of comparative insecticide toxicology,

particularly in elucidation of the mechanisms of biotransformation. During his 37 years at this university, he was instrumental in adapting and developing powerful new methods for the study of pesticide persistence, distribution, and breakdown products, including radiotracers and gas chromatography. We acknowledge his many contributions to pesticide degradation and remember him fondly as a scientist, teacher, and friend.

The editors thank the contributors to this volume for their excellent research reviews of current knowledge on pesticide transformation products as well as some of the research and regulatory issues that face individuals and institutions working in this important field. We are grateful for the efforts and expertise of the scientists who served as peer reviewers for the chapters published in this volume. We hope this collective work will serve as a valuable focus of research and opinion on the subject of pesticide transformation products and will stimulate future research and regulatory policies.

We express our appreciation to the Agrochemicals Division of the American Chemical Society for providing a forum for this work. We also thank John Teeple, Amy Marsh, Ellen Kruger, and Maureen Rouhi for their valuable assistance in the preparation of this book.

We dedicate this book to our parents, Nachammai and Lakshmanan Somalay, and William G. and Catherine (Dodds) Coats, for their love, support, and keen interest in our professional achievements.

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