
Preface

Pesticides are a broad class of bioactive compounds used in crop protection, food preservation, and human health. They differ from other chemical substances because they are spread deliberately into the environment. Presently, about 1000 active ingredients have been registered that can be grouped into more than 40 classes of chemical families. Exposure to pesticides through the most important routes of uptake (oral, dermal, and inhalation) depends on the physicochemical characteristics of the pesticide and the nature of the contact, varying with the edge, lifestyle, and working conditions. The level of pesticides in different environmental compartments—such as water, agricultural foods, and products of animal origin—has become a relevant issue. Moreover, analytical measurements of dermal exposure and exposure by inhalation have become as important as analytical measurements of internal dose.

Unlike other contaminants, pesticides may affect both workers and the general population as a result of the consumption of contaminated food and water, domestic use, and proximity to agricultural settings. Information about actual human exposure to pesticides has important uses, including informing risk assessments, helping predict the potential consequences of exposures, and developing exposure criteria for regulations and other public policy guidance.

Pesticide exposure can be measured through the biomonitoring of the parent compounds and/or metabolites in such body fluids as urine, blood, serum, and saliva, among others. Indoor exposure may take place through treated furniture, or such home structures as fitted carpets or wood-treated walls. Regarding outdoor exposure, the main sources are represented by spray drifts of pesticides from agricultural and industrial areas and by the atmospheric dispersal of pesticides evaporated from treated surfaces. Very little information is available on dermal and inhalation exposure to pesticides. Contamination of food represents one of the most pervasive sources of pesticide exposure for the general population.

Pesticide analysis has been affected by the recent detection of parent or metabolite compounds, thus driving the demand for techniques that can measure lower and lower levels of concentration. In recent years, criteria to support in a solid way the steps corresponding to the identification, confirmation, and quantification of the analyte have become more frequently used.

During the last decade, noticeable changes in multiresidue methods have taken place. Chromatography remains the workhorse technique for pesticides. The development of different types of injection techniques, columns, stationary phases, and detectors has allowed for the improvement in the sensitivity and selectivity of the analytical determinations. The availability in analytical laboratories of mass spectrometry detectors coupled to gas chromatography, as well as to liquid chromatography, has increased the degree of confidence in the identification of organic compounds. Other techniques, such as capillary electrophoresis, are promising

candidates for a relevant role in this area. The current use of powerful analytical tools coupled with the application of quality control/quality assurance criteria has resulted in an increase in the reliability of an analysis. However, special emphasis is needed on the development of multiresidue methods for the analysis of as many pesticides as possible in one analytical run.

Pesticide Protocols contains methods for the detection of specific compounds or their metabolites useful in biological monitoring and in studies of exposure via food, water, air, and skin. Liquid and gas chromatography coupled to mass spectrometry detection, and other classic detectors, are the most widely used techniques, although such others as capillary electrophoresis and immunochemical or radioimmunoassay methods are also proposed. Chapters cover the varied array of analytical techniques applied to the analysis of several families of pesticides. The extractions and cleanup procedures have been focused in order to use more automated and miniaturized methods, including solid-phase extraction, solid-phase micro-extraction, microwave-assisted extraction, or on-line tandem liquid chromatography (LC/LC) trace enrichment, among others.

All methods have been written by scientists experienced in pesticide analysis in different matrixes. Each chapter describes a specific method, giving the analytical information in sufficient detail that a competent scientist can apply it without having to consult additional sources. Our book will prove valuable as a general reference and guide for students and postgraduates, as well for researchers and laboratories alike.

We would like to express our personal gratitude to all the authors for the quality of their contributions. Thanks are also owed to Professor John Walker and to Humana Press for allowing us to edit this volume.

José L. Martínez Vidal
Antonia Garrido Frenich

Pesticide Protocols

Martínez Vidal, J.L. (Ed.)

2006, XIV, 504 p. 103 illus., Hardcover

ISBN: 978-1-58829-410-4

A product of Humana Press