
In the United States, about 40% of drinking water is drawn from domestic wells. As more and more compounds are being detected in the wells, the occurrence of pesticides in drinking water remains a public concern. In this book, the author provides a comprehensive summary of the distribution of pesticides in domestic wells surveyed in the past 10 to 20 years at state, regional, and national scales. Presentation of the survey information for selected geographical and political regions occupies about one-half of the book. In the second half, the author discusses toxicological, technological, and management issues related to the occurrence and removal of pesticides from groundwater.

The book is organized into nine chapters. The pesticide survey information that makes up Part 1 of the text is presented and discussed in Chapters 2 to 4. Pesticide surveys at the national and regional levels are summarized in Chapter 2. The author included two national surveys and two regional surveys. The first national survey was conducted by USEPA between 1988 and 1990, and involved a total of 1349 wells nationwide. A main objective of this survey was to assess the frequency of occurrence and the concentration of nitrate and pesticides in drinking water wells. The second national survey that the author discussed in the book was carried out between 1988 and 1989 by Monsanto Corporation with assistance from the Research Triangle Institute. The ultimate goal of this survey was to provide data for the reregistration of alachlor, a pesticide manufactured by Monsanto. Similar to the EPA survey in terms of area covered, 1430 rural private wells were sampled in alachlor-use areas comprising 89 counties belonging to 26 states. The two regional surveys that the author discussed in the book are the Midcontinent Herbicide Initiative by USGS and the Ciba Survey of Atrazine and its Metabolites in Well Water by Ciba Crop Protection, a division of the Ciba-Geigy Corporation. The Midcontinent Herbicide Initiative, commonly referred to as the Midcontinent Study, was a reconnaissance of the distribution of herbicides and nitrate in groundwater in the midcontinental regions of the United States. A total of 303 wells were sampled between 1991 and 1992 in the upper Mississippi, Missouri, and Ohio river basins, covering most or all of the states of Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, and Nebraska, and a smaller portion of Kansas and North and South Dakota. The Ciba survey, completed by 1996, was an assessment of atrazine and its degradation products in groundwater sampled from 1505 wells covering 19 states. This survey showed that more than 30% of the well water samples from Wisconsin, Hawaii, West Virginia, Minnesota, Maryland, and Iowa exceeded the detection limit of 0.1 mg L⁻¹. Wisconsin, Minnesota, and Iowa had the highest number of wells exceeding a total concentration of 3 μg L⁻¹.

Pesticide surveys at the state level are summarized in Chapter 3. The state-level data were in most cases generated by means of statewide or regional studies to assess pesticide contamination of rural domestic wells or produced by monitoring studies in suspected contamination areas. The author compiled the data by sending survey letters to state pesticide control officials and by gathering published studies in the literature. Summary data are presented for California, Colorado, Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Carolina, Texas, Wisconsin, and Ontario and Prince Edward Island in Canada. As the author indicated, the level of details varied considerably from state to state. States with more detailed data are Illinois, Iowa, Minnesota, and Wisconsin.

In Chapter 4, the author discusses comparability issues among the national-, regional-, or state-level survey studies. Also, as a transition to the second part of the book, factors that contribute to the occurrence of pesticides are discussed. Presented in primarily tabular format, the author compares and contrasts the design of these survey studies; the hydrologic, soil, climate, and land use factors that affect the occurrence of pesticides in wells; methods of sample collection; and sample analytical procedures.

The second half of the book starts with Chapter 5, in which the author begins to discuss, in more general terms, the toxicological, technological, and management issues related to the occurrence of pesticides in wells and their removal from groundwater. The toxicological and human health issues are discussed in Chapter 5. Data on dose-response and exposure risk factors of selected pesticides and their metabolites are summarized. The author also presents a brief introduction of EPA’s health advisory assessment indices. In Chapter 6, a brief description of mechanisms and design consideration is given on the technological aspects of removing pesticides from contaminated groundwater. Techniques such as reverse osmosis and activated carbon filters are generally similar to those used in industrial and municipal water treatment facilities. In Chapters 7 through 9, the author discusses management and regulatory issues that relate to pesticide use, and the sustainability of agriculture.

Overall, the book is short and easy to read. The chapters vary greatly in the breadth and depth of the topics covered. The strength of the book is the synergistic presentation of national-, regional-, and state-level pesticide survey information found in Chapters 2 and 3. Whereas the pesticide survey data can be a good source of reference for interested research scientists and regulatory officials, the second part of the book, especially Chapters 5 and 6, is useful for undergraduate and graduate students as an introduction to the environmental fate of pesticides in groundwater.

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