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Book reviews

Reaction Mechanisms in Environmental Organic Chemistry. By R.A. Larson and E.J. Weber. Lewis Publishers, CRC Press, Boca Raton, USA, 1994. xiv + 433 pp. Price £56. ISBN 0-87371-258-7.

The physical and chemical factors that govern the transport of organic compounds in the environment have been intensely studied. Organic reactions that transform particular chemicals into by-products, however, have received significantly less attention. Studies involving organic reactions under environmental conditions have shown that the environmental alteration products of some organic molecules are much more hazardous than their precursors; for example, treatment of natural waters with chlorine causes potentially toxic or mutagenic organochlorine compounds to be formed.

The purpose of this volume is to assist in the understanding of fundamental environmental chemistry by providing an overview of the environment, of the principal organic chemical species in it, and of the processes and reactions that tend to transform such species. The reactions of environmentally important organic compounds are illustrated using traditional mechanistic and physical organic chemistry concepts and data.

The initial introductory chapter conveys a detailed description of the three principal environmental compartments, namely air, water and solid phases, and surveys the conditions found in each of them that tend to promote chemical reactions. The largest fraction of identifiable dissolved organic compounds, in both marine and fresh waters, is carbohydrate in nature, as is approximately 10% of the organic matter in oil. The remainder of the book is an in-depth study of the principal types of organic reactions that may occur under environmental conditions, with discussions on the particular structural features of organic molecules that may make them more or less susceptible to each type of reaction.

Chapters 2 and 3 deal with hydrolyses and reductions, respectively, the latter being a process that until recently has been neglected from an environmental perspective. The fourth chapter takes place in a range of environments, from the upper atmosphere to the surfaces of sediments, and encompasses a plethora of oxidising agents. In Chapter 5, disinfection is discussed. Such reactions and their projects are the subject of public debates in virtually every community in which water treatment is undertaken.

Sunlight-induced reactions (photochemistry) are covered in Chapter 6. Such reactions will undoubtedly come under increasing scrutiny, as the world adjusts to life under a changing regime of solar energy, featuring higher levels of short; energetic UV-B wavelengths. Finally, Chapter 7 contains a variety of other reactions that do not fit into any of the aforementioned categories, but are nevertheless significant in determining the fate of many classes of compounds.

This is a well-presented and thoroughly indexed volume that is an essential reference work on environmental chemistry for all those working in water treatment, hazardous waste and environmental engineering.

John F. Kennedy
Charles J. Knill

Analyzing Food for Nutrition Labeling and Hazardous Contaminants — Food Science & Technology, Vol. 65. Edited by I.J. Jeon and W.G. Ikins. Marcel Dekker, New York, USA, 1995. viii + 496 pp. Price $165. ISBN 0-8247-9349-8.

The analysis of foodstuffs for particular chemical components can be extremely challenging due to the complicated nature of the matrices involved. This is especially true when the analysis is intended to provide nutrition labelling information or is focused on the identification and quantitation of hazardous contaminants.

This volume has been designed as a practical guide to assist analysts in deciding which methodologies to adopt for a particular analysis and help those who are seeking an improved method relative to the one that they currently use. When selecting a method, one often considers accuracy and precision to be the most important criteria. However, a number of other factors are often of equal importance in a practical situation, such as speed, convenience and cost of the analysis. Each chapter of this book is devoted to giving the reader more insight into the advantages and disadvantages of performing an analysis by a particular method.

The first half of the book deals specifically with the analytical methodologies that pertain to nutrition labelling, or by tackling subject areas in terms of food component types. Areas covered include fatty acids, cholesterol, carbohydrates, dietary fibre, proteins and amino acids, minerals, and vitamins. The second half of the book is devoted to the analysis of hazardous contaminants in foods, and covers topics such as mycotoxins, pesticide residues, lipid-derived toxins, naturally occurring hazards and toxins arising from the cooking/processing of foodstuff materials.

This comprehensive reference manual serves as a valuable resource for individuals in regulatory agencies, quality control, food safety and food industry personnel. It