Takayuki Shibamoto (Ed.):

Chromatographic analysis of environmental and food toxicants

Books and Software in Review

Book's topic

A variety of toxic substances, either from natural or synthetic origin, can be found nowadays both in food and the environment. As a result, human health might be jeopardized by those compounds, not only through acute toxicity but also by chronic toxicity. Due to human activity and its impact on the environment, numerous toxic substances are being identified at present, including chemicals, pesticides, pharmaceuticals, drugs of abuse, and natural toxins. As a consequence, research on detection and accurate analysis of those toxicants is a hot topic today. Different analytical approaches are applied to this task, including the use of sensors, enzyme-based assays, and immunoassays, among other techniques. In this sense, chromatographic analysis stands out as the most widely used tool to separate and analyze toxic compounds. Several chromatographic approaches may be applied depending on the chemical nature of the toxic substances to be determined, allowing their proper separation and enhancing their subsequent detection. This characteristic is of utmost importance to provide a very high sensitivity even appropriate for trace amounts quantification. The book *Chromatographic analysis of environmental and food toxicants* by T. Shibamoto provides a broad perspective on the use of chromatography to detect and quantify dangerous substances in foods and the environment. Specifically, the book groups the most significant applications for diverse chemical groups of toxic substances which are covered by renowned experts in the field having strong expertise in the field.

Contents

The book is composed of 10 chapters for a total of 331 pages. Each chapter is focused on a particular group of toxic compounds. This way, the specific aspects concerning their toxicity, sample preparation, and chromatographic analytical approaches and relevant published applications are separately described and discussed. These families comprise polycyclic aromatic hydrocarbons, polychlorinated biphenyls, nitrosamines, heterocyclic amine mutagens and carcinogens, mycotoxins, nitrobenzene and related compounds, 2,3,7,8-tetrachlorodibenzo-p-dioxin, organophosphorus esters, insecticidal carbamates, and carbonyl compounds. A good number of tables and figures illustrate each group of applications showing the most relevant aspects already applied to the determination of these components. These cover sample preparation aspects as well as analytical (separation and detection) aspects. Figures including the most important chemical structures help the reader to focus on the analytical needs and challenges associated with the nature of each group of compounds.

Comparison with the existing literature

Multiple books dealing with the application of chromatography to analyze toxic components and contaminants may be found either in the environment as in food, since the publication of this book. Examples include Chromatographic analysis of the environment: mass spectrometry based approaches by Leo M.L. Nollet and Dimitra A. Lambropoulou (CRC Press, 2017, 4th Edition) including aspects relating the use of liquid and gas chromatography coupled to mass spectrometry for the detection and quantification of different toxic components in the environment. Other books are either focused on a particular analytical technique (e.g., gas chromatography) or in a given group of toxic compounds (e.g., mycotoxins). However, the present book offers an integrative perspective of both fields of application including a variety of different toxicants. Its main focus is on the components to be determined instead of the type of sample being analyzed.

Critical assessment and readership recommendation

The material presented in this book can be considered as a good background with high value for scientists and PhD students seeking a first insight on the application of chromatography to determine toxic compounds in environmental and food matrices. Thus, those working in the fields of environmental analysis and food safety will find relevant and interesting information for their research. Published back in 1998, it should be regarded as a reference book to gain information on this particular field, although plenty of new applications and developments have been obviously presented since then.

Summary

The present book is a classic contribution dated more than 20 years ago that merges the chromatographic analysis of toxic components in important fields like environmental and food analysis. Each specific chapter included presents relevant information regarding all the analytical steps for different groups of toxic components with different chemical nature. The book presents interesting information to get a first view on the topic to acquire a good background knowledge that can be later on expanded to more recent developments.

Bibliography

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