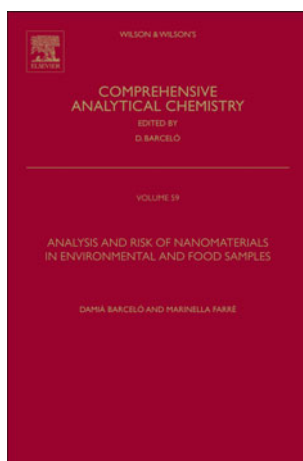


Damià Barceló and Marinella Farré (Eds.): Analysis and risk of nanomaterials in environmental and food samples

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Bibliography

Analysis and risk of nanomaterials in environmental and food samples
Damià Barceló and Marinella Farré (Eds.)

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Book's topic This book edited by Barceló and Farré covers a wide range of analysis, applications, and assessment of nanomaterials (NM) in the environment and food. In the book, inorganic and organic engineered nanoparticles (ENP) are considered as well as biopolymer-based NM. The authors give a suite of analytical instruments and methods to detect and characterize NP in (waste)water, soil, air, and food samples, also including aspects of sampling and sample preparation. Beneficial applications of NM and ENP in environmental remediation and in water treatment are also addressed, taking into account that there are obvious limitations, environmental risks, and (eco)toxicological impacts.

In addition to general chapters, the book provides some special chapters on dendrimers and fullerenes, on electrophoretic

separation methods, ENP in textile products and textile wastewaters, and NM in food.

Contents The book consists of ten chapters. In the first chapter, the editors give a comprehensive introduction to the subject of the book, considering the most important classes of NM and their applications. Furthermore, analytical methods for the characterization and quantitative analysis of NM are addressed. Toxicological aspects of NM, including food-related NM, are also reflected.

The second chapter gives a detailed overview on electrophoretic techniques (capillary electrophoresis, dielectrophoresis) for the separation and characterization of NP. Detailed examples are given for noble metal NP, carbon-based NP, quantum dots as well as other NP such as metal oxide NP and polymeric NP.

Chapter 3 deals with the application of different NM in (bio)remediation of contaminated (waste)water and soil, with special emphasis on the usage of biopolymer-based NM (e.g., chitosan-based NP, and natural peptides). The comprehensive contribution critically reflects the chances and limitations associated with nanoremediation and the application of NM in water technology.

Chapter 4 is devoted to the analysis, fate, and behavior of organic NM in the environment, including soils, aquatic systems, and the atmosphere. A broad overview of analytical instruments and methods is given which are adequate to characterize and quantify organic NM in environmental samples.

Chapter 5 deals with ENP in natural waters. The chapter summarizes in detail the state of knowledge in this field and gives a number of suitable analytical methods to characterize ENP in the liquid phase.

Chapter 6 covers dendrimers and their assessment in the aquatic environment, including aspects of their chemistry, analytical characterization, and (eco)toxicity.

Chapter 7 deals with the impact and the analytical characterization of engineered NM in textiles and in textile waste

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water. In particular, recent patents related to the application of engineered NP in textiles are presented.

Chapter 8 provides a short discussion on the benefits and risks of inorganic ENP in the environment, considering their outstanding physicochemical properties, their application in environmental remediation, and their environmental toxicity.

Chapter 9 focuses on the occurrence of fullerenes in the atmospheric environment. Detailed information is provided on sample collection, sample preparation, and the subsequent quantification of fullerenes.

Chapter 10 is devoted to natural and engineered NM in food. A comprehensive overview of the manifold applications and regulations in this field is given, critically reflecting the toxicological aspects and risk assessment of NM in food. Furthermore, analytical approaches are shown to characterize and quantify NM in food matrixes.

Comparison with the existing literature In recent years, such a large number of scientific articles and textbooks on nanotechnology and nanomaterials, especially ENP, have been published that it is difficult to survey them. A large proportion of such textbooks are devoted to NM and NP in information technology, electrical engineering, and materials science. On the other hand, only several dozen textbooks on NM/NP in environmental systems address the questions of their application, analysis, and risk assessment.

What is the main added value of this book? In particular, the book gives a practice-oriented and integrated

view of suited analytical methods and instruments for the characterization and quantification of various NM/NP in different matrixes, considering the related challenges and difficulties. It gives clear indications that we are still far away from having reliable data on the occurrence of NM/NP in the environment and therefore far from a substantial understanding of the long-term impact of NM/NP.

Critical assessment The book is, without any doubt, valuable and gives sound and condensed information. As for many textbooks, the main drawback is the missing connection between the ten chapters. It would have been helpful to give a clear outline and overview of the book in the introductory chapter, a kind of graphical abstract and/or framework indicating the connections between the chapters. Furthermore, it is hard to follow the arrangement of the ten chapters in the book.

Summary I highly recommend this book to everyone interested in the environmental and analytical aspects of NM and NP. It is a comprehensive and stimulating book rich in references to literature. In particular, the chapters with special focus (e.g., Chapt. 2, electrophoretic separation; Chapt. 6, dendrimers; Chapt. 7, textiles; Chapt. 10, food) are extensive compilations. The book will be helpful and useful for students, graduates, and scientists working in the fields of analytical chemistry, environmental science, and nanotechnology.