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# **Emerging Contaminants from Industrial and Municipal Waste Occurrence, Analysis and Effects**

Volume Editors: Damià Barceló · Mira Petrovic

With contributions by

M. L. de Alda · D. Barceló · J. Blasco · A. DelValls · M. Farre  
M. Gros · M. Huerta-Fontela · M. Kuster · M. Petrovic · C. Postigo  
J. Radjenovic · T. Smital · F. Ventura

Environmental chemistry is a rather young and interdisciplinary field of science. Its aim is a complete description of the environment and of transformations occurring on a local or global scale. Environmental chemistry also gives an account of the impact of man's activities on the natural environment by describing observed changes.

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## Preface

This book on “Emerging Contaminants from Industrial and Municipal Waste” is based on the scientific developments and results achieved within the European Union (EU)-funded project EMCO (reduction of environmental risks posed by emerging contaminants, through advanced treatment of municipal and industrial wastes). One of the key elements of the EMCO project was to provide support to the various Western Balkans countries involved in the project as regards the implementation of the Water Framework Directive (WFD) (2000/60/EC). A regional network, as proposed by the EMCO project, aiming to ensure the comparability (and reliability) of measurement data obtained by screening methodologies for water quality management, would support the EU Water Initiative, which aims to promote co-operation between countries in order to better manage their water resources.

The EMCO project addressed basically two directives: Directive 91/271/EEC to reduce the pollution in Community surface waters caused by municipal waste and the IPPC Directive (Directive 96/61/EC). This Directive expands the range of pollutants that should be monitored in industrial effluent discharges like those from the paper and pulp industry, refineries, textiles and many other sectors. The EMCO project has devoted its attention to the wastewater treatment technologies, especially in the Western Balkan countries. It is obvious that building up and improving wastewater treatment plant performance in the public and private sectors will avoid direct pollution of receiving waters by urban and industrial activities.

The book is divided into two volumes: Vol. I—Occurrence, Analysis and Effects, and Vol. II—Removal Technologies.

Volume I is structured in several chapters covering advanced chemical analytical methods, the occurrence of emerging contaminants in wastewaters, environmental toxicology and environmental risk assessment. Advanced monitoring analytical methods for emerging contaminants cover the use of liquid chromatography combined with tandem mass spectrometric detection or hybrid mass spectrometric techniques. It is certainly known that without these advanced mass spectrometric tools it would not be possible to investigate the fate and behaviour of emerging pollutants at the wastewater treatment plants and receiving waters at the nanogram per litre level. Ecotoxicology is also a very relevant aspect that should be taken into consideration for emerging



contaminants, and it is also covered in this book. Risk assessment methodologies will allow us to critically establish the good performance of an appropriate wastewater treatment technology for the removal of urban, agricultural and industrial wastewaters.

Volume II covers different treatment options for the removal of emerging contaminants and includes membrane bioreactors (MBR), ozonization and photocatalysis, and advanced sorbent materials together with more conventional natural systems, such as artificial recharge and constructed wetlands. The MBR is an emerging technology based on the use of membranes in combination with traditional biological treatment. It is considered as a promising technology able to achieve more efficient removal of micro-pollutants in comparison to conventional wastewater treatment plants. Other examples reported in the book are advances in nanomaterials, also an emerging field in wastewater treatment, which are providing great opportunities in the development of more effective wastewater treatment technologies.

Overall, this book is certainly timely since the interest in emerging contaminants and wastewater treatment has been growing considerably during the last few years, related to the availability of novel treatment options together with the advanced and highly sensitive analytical techniques. This book can also be considered, in a way, the follow-up of two previous books in this series entitled *Emerging Organic Pollutants in Waste Waters and Sludge*, Vols. 1 and 2 (51 and 50), published in 2004 and 2005. The present book is complementary to these volumes since here much more attention has been devoted to wastewater treatment systems, which are a key part of this book.

The book will be of interest to a broad audience of analytical chemists, environmental chemists, water management operators and technologists working in the field of wastewater treatment, or newcomers who want to learn more about the topic. Finally, we would like to thank all the contributing authors of this book for their time and effort in preparing this comprehensive compilation of research papers.

Barcelona, September 2008

D. Barceló  
M. Petrovic

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