The Handbook of Environmental Chemistry

Founded by Otto Hutzinger

Volume 36

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Personal Care Products in the Aquatic Environment

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Aims and Scope

Since 1980, *The Handbook of Environmental Chemistry* has provided sound and solid knowledge about environmental topics from a chemical perspective. Presenting a wide spectrum of viewpoints and approaches, the series now covers topics such as local and global changes of natural environment and climate; anthropogenic impact on the environment; water, air and soil pollution; remediation and waste characterization; environmental contaminants; biogeochemistry; geoecology; chemical reactions and processes; chemical and biological transformations as well as physical transport of chemicals in the environment; or environmental modeling. A particular focus of the series lies on methodological advances in environmental analytical chemistry.

Series Preface

With remarkable vision, Prof. Otto Hutzinger initiated *The Handbook of Environmental Chemistry* in 1980 and became the founding Editor-in-Chief. At that time, environmental chemistry was an emerging field, aiming at a complete description of the Earth's environment, encompassing the physical, chemical, biological, and geological transformations of chemical substances occurring on a local as well as a global scale. Environmental chemistry was intended to provide an account of the impact of man's activities on the natural environment by describing observed changes.

While a considerable amount of knowledge has been accumulated over the last three decades, as reflected in the more than 70 volumes of *The Handbook of Environmental Chemistry,* there are still many scientific and policy challenges ahead due to the complexity and interdisciplinary nature of the field. The series will therefore continue to provide compilations of current knowledge. Contributions are written by leading experts with practical experience in their fields. *The Handbook of Environmental Chemistry* grows with the increases in our scientific understanding, and provides a valuable source not only for scientists but also for environmental managers and decision-makers. Today, the series covers a broad range of environmental topics from a chemical perspective, including methodological advances in environmental analytical chemistry.

In recent years, there has been a growing tendency to include subject matter of societal relevance in the broad view of environmental chemistry. Topics include life cycle analysis, environmental management, sustainable development, and socio-economic, legal and even political problems, among others. While these topics are of great importance for the development and acceptance of *The Handbook of Environmental Chemistry,* the publisher and Editors-in-Chief have decided to keep the handbook essentially a source of information on "hard sciences" with a particular emphasis on chemistry, but also covering biology, geology, hydrology and engineering as applied to environmental sciences.

The volumes of the series are written at an advanced level, addressing the needs of both researchers and graduate students, as well as of people outside the field of

"pure" chemistry, including those in industry, business, government, research establishments, and public interest groups. It would be very satisfying to see these volumes used as a basis for graduate courses in environmental chemistry. With its high standards of scientific quality and clarity, *The Handbook of Environmental Chemistry* provides a solid basis from which scientists can share their knowledge on the different aspects of environmental problems, presenting a wide spectrum of viewpoints and approaches.

The Handbook of Environmental Chemistry is available both in print and online via www.springerlink.com/content/110354/. Articles are published online as soon as they have been approved for publication. Authors, Volume Editors and Editors-in-Chief are rewarded by the broad acceptance of *The Handbook of Environmental Chemistry* by the scientific community, from whom suggestions for new topics to the Editors-in-Chief are always very welcome.

Damià Barceló
Andrey G. Kostianoy
Editors-in-Chief

Volume Preface

Nowadays major sources of water pollution are agricultural runoff and domestic and industrial effluent discharges. Organic pollutants present can accumulate in rivers and other water bodies and affect water quality and species survival. The active ingredients used in personal care products are increasingly detected in the environment and consist of a large group of chemicals with a wide range of physicochemical properties, which make them to be present in solution, adsorbed onto sediments and accumulated in biota. These substances are used in large quantities in everyday life, being added in cosmetics and personal hygiene products, such as deodorant, after shave, shampoo, perfume and makeup.

This book on *Personal Care Products in the Aquatic Environment* contains comprehensive information on the fate and removal strategies of the various ingredients used as personal care products and the aquatic environment as well as their impact on human health. Most of the published work so far deals with the stability of the commercial products and issues related to skin penetration. However, in the recent years, the general interests have shifted to know the risk of this large and diverse chemical group of anthropogenic contaminants in environment and humans. They can be considered part of the so-called emerging contaminants that are present worldwide in the aquatic environment, from groundwater to marine mussels. This book presents the latest developments as regards their determination, spatial distribution, degradation and risk categorization in the aquatic environment. This will be of great help to the reader to make a holistic picture of the current environmental problems connected with the widespread use of personal care products.

The book is structured in 14 chapters written by well-recognized experts in this field. The various chapters cover occurrence in water, solid samples and biota, advanced chemical analytical methods, non-conventional degradation technologies, (eco)toxicity and environmental and human risk assessment. The first chapter of the book is devoted to a general introduction to personal care products. It covers the key aspects of the diverse group of substances included in this category of chemicals (UV filters, preservatives, fragrances, etc.), which may be of especial

interest for newcomers and first-year Ph.D. students. The information provided includes physicochemical characterization, regulatory frameworks and health effects on biota and humans. In the final chapter, we discuss the major scientific achievements and future research trends. Knowledge gaps are identified too as regards the environmental and human issues associated to the daily use of personal care products.

We expect that *Personal Care Products in the Aquatic Environment* will become a useful book. The book is multidisciplinary, so it will attract experts from various fields of expertise like analytical and environmental chemistry, toxicology and environmental engineering. Since the book also covers not only continental but also marine waters, it should be of interest to the researchers working in marine pollution and related activities like aquaculture.

Finally, we would like to express our gratitude to all the contributing authors of this book for their willingness, effort and time devoted to the preparation of their respective piece of research.

Barcelona, Spain
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