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### Book Reviews

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## BOOK REVIEWS

**Reviews of Environmental Contamination and Toxicology**, Volume 193, edited by David M. Whitacre, Heidelberg, Germany, Springer-Verlag GmbH, 2008, 298 pp., EUR89.95, ISBN: 978-0-387-73162-9

The role of this *Reviews* series is to publish detailed scientific review articles on all aspects of environmental contamination and associated toxicological consequences. Previous volumes in the series have recently been reviewed in this section of the journal (see *IJEAC*, **88**, 674–6, 2008). The present volume includes four articles. The first one, on ‘Remediation technologies for organochlorine-contaminated sites in developing countries’, defines the technical considerations to be used when dealing with organohalogenated compounds contaminated sites in a developing country like Chile, based on the remediation technologies used in Europe and easily transferable to these countries. These technologies include, basically, soil washing followed by a further wastewater treatment consisting of filtration and an adsorption process.

The ‘Chemistry and fate of triazolopyrimidine sulfonamide herbicides’ is the subject of the next review. The chapter provides an overview on their physicochemical properties, modes of action and environmental fate, emphasizing some gaps of knowledge that should require further research. The following chapter on ‘Parameters for carbamate pesticide QSAR and PBPK/PD models for human risk assessment’ provides an extensive review (more than 150 pages) on the parameters suitable for building QSAR and PBPK/PD models for assessing human risk to aldicarb, carbaryl, carbofuran, formetanate, methiocarb, methomyl, oxamyl, pirimicarb, propoxur and thiodicarb, and their corresponding metabolites. While searching for the parameters, PBPK/PD models and tissue/blood partition coefficients are developed for these compounds based on their metabolic pathways. As there is limited information on the enzymes carrying out hydrolysis or their rate constants, it is concluded that there is a need to develop enzyme activity and enzyme content to support risk assessment methodologies involving the above models.

The final chapter, entitled ‘Persistent organic pollutants in Vietnam: Environmental contamination and human exposure’ provides a comprehensive review of the studies carried out on POPs in Vietnam. The contamination status of the different environmental compartments (air, water, soil/sediments, biota and foodstuffs) are extensively reviewed, as well as the environmental behaviour and bioaccumulation. Particular attention is given to the human health implications, with DDT and dioxins as major issues. The levels, exposure and temporal trends are discussed in the context of the studies carried out in other countries of the Asian-Pacific region. The information provided is complementary to that presented in another recent book entitled *Persistent Organic Pollutants in Asia* (see *IJEAC*, **88**, 679, 2008).

**Reviews of Environmental Contamination and Toxicology**, Volume 194, edited by David M. Whitacre, Heidelberg, Germany, Springer-Verlag GmbH, 2008, 182 pp., EUR90.90, ISBN: 978-0-387-74815-3

Following the scope of the series, this volume includes four reviews on different subjects related to the presence and toxicity of environmental contaminants and to environmental contamination cases. The first one on 'Microbially derived off-flavor from geosmin and 2-methylisoborneol: Sources and remediation' presents an extensive review of the chemical and biological causes of muddy and musty flavour problems, especially with reference to off-flavour in aquatic organisms and possible remediation techniques, including conventional physical and chemical methods, the use of algicides, biosorbents and bioremediation procedures.

The next chapter, entitled 'Mercury in the San Francisco estuary', offers a literature survey on mercury contamination and biogeochemistry, to stimulate scientific questions addressing mercury contamination in this and other estuarine systems, as well as to describe the restoration and management efforts that accompany mercury-contaminated sites. Next, 'DDE remediation and degradation' addresses the issue in soil and water, predominantly using phytoremediation, aerobic and anaerobic biodegradation and abiotic degradation. Although the environmental persistence of DDT and its metabolites DDD and DDE has been the subject of extensive attention during the past, the previous focus on DDT has overshadowed DDE, whose concentrations in different environmental compartments remain unchanged for more than 20 years. In this respect, the report concludes that there still remain many open avenues of research.

Finally, there is a chapter on 'Surfactant effects on environmental behaviour of pesticides' that comprehensively reviews, through more than 80 pages, the underlying mechanisms of the surfactants' effects on the distribution and transformation of pesticides in the environment. The review deals with the basic properties of surfactants used in pesticides formulations together with their environmental behaviour in plants, soils and water. The effects on pesticides' solubilisation, volatilisation, hydrolysis, photolysis, mobility and degradation in soil are then discussed. The chapter concludes with sections on the effects of surfactants on pesticides' behaviour in plants (root and foliar uptake), on the pesticides' residues and on bioconcentration in the edible parts of terrestrial plants.

**Reviews of Environmental Contamination and Toxicology**, Volume 195, edited by David M. Whitacre, Heidelberg, Germany, Springer-Verlag GmbH, 2008, 185 pp., EUR90.90, ISBN: 978-0-387-77029-1

This volume reviews the current state of knowledge of the occurrence, fate and ecotoxicology of several organic and inorganic species in the environment and points out areas where additional research is warranted. The first chapter entitled 'The environmental impact of growth-promoting compounds employed by the United States beef cattle industry: History, current knowledge, and future directions' takes in hand the evidence that growth-promoting compounds used on beef cattle may travel to the aquatic environment and cause endocrine-disrupting effects on fish populations. The principal hypothesis of the review is that the environmental risks associated with finishing beef cattle feedlots are best dealt with when there is a thorough understanding of the implant strategies used in feedlots, the environmental fate of the growth-promoting compounds used in the feedlot and the effect that these growth promoters have on fishes should they

reach surface waters. These aspects are extensively covered throughout the text, indicating the main gaps of knowledge.

Two chapters are devoted, respectively, to arsenic and lead. 'Arsenic in marine mammals, seabirds and sea turtles' is one of the very few reviews published on the topic. Since marine mammals, seabirds and sea turtles display unique features in metals accumulation this is a timely review. Special attention is devoted to the distribution of arsenic species in the tissues of these organisms, their maternal transfer and the accumulation mechanism of arsenobetaine. Finally, new lipid-soluble arsenicals and future areas of study are highlighted.

'Lead contamination in Uruguay: The "La Teja" neighbourhood case' updates the available information published or reported after 2001, when lead poisoning was officially recognised as a rising health problem in Uruguay. This information includes data on lead sources and environmental and occupational exposure from pollution events in Uruguay, particularly focused on the Montevideo district ("La Teja") where most children had blood lead levels above reference intervention limits. Actions taken to mitigate or prevent lead exposure in Uruguay as well as the legal framework developed after this pollution episode are described.

Finally, two more chapters cover different aspects of the chemistry and biochemistry of pyrethroid insecticides. The chapter on 'Environmental chemistry, ecotoxicity, and fate of lambda-cyhalothrin' provides an overview on recent literature available on the use and environmental fate of this new insecticide of the pyrethroid family. The studies indicate that widespread use of lambda-cyhalothrin has resulted in residues in sediment that have been found to be toxic to aquatic organisms. Therefore, mitigation measures are proposed to reduce these adverse effects. On the other hand, the review entitled 'Applications of carboxylesterase activity in environmental monitoring and toxicity identification evaluations (TIEs)' aims at examining uses of carboxylesterase activity with a specific emphasis on monitoring of pyrethroid insecticides. The review begins with an overview of the enzyme class biological significance and their role in detoxification and its application in environmental monitoring on an organism-specific basis. As the current TIE protocols devised for the identification of insecticides in aquatic and soil samples do not identify with certainty pyrethroid-associated toxicity, a series of case studies are presented to emphasize the role of carboxylesterase to this end.

**GC/MS: A Practical User's Guide**, Second Edition, by Marvin C. McMaster, Hoboken, NJ, USA, John Wiley & Sons, Ltd, 2008, 180 pp., £39.50, ISBN 978-0-470-010163-6

This book is an introductory textbook for novice chromatographers who need to develop their skills in using this technique to analyse and identify compounds for various applications.

Part I presents a comparative look at gas chromatography/mass spectrometry (GC/MS) and competitive instrumentation. Then, an overview of the components of a generic GC/MS system is provided. Finally, it is discussed how to set up a system and perform an analysis run that provides the needed information. After obtaining some hands-on experience, Part II on optimisation provides information on tuning and calibration of the mass spectrometer, cleaning, troubleshooting problems, processing information, and interfacing to other analytical and data systems; that is, getting the whole system up and running and getting useful information. Part III refers to the use of GC/MS in research, environmental and toxicology laboratories, as well as in space science and

hazardous materials detection in the field. Although quadrupole mass spectrometers are predominately used in commercial laboratories, ion trap, time-of-flight and hybrid MS/MS systems are also discussed briefly. LC/MS is also introduced. Finally, accurate mass determination required for molecular formula and structures are discussed next.

The book includes several appendices on frequently asked questions, troubleshooting references, sources of background contamination, glossary terms and selected reading as well as a CD with a PowerPoint slide presentation and self-study material. This is a reliable, hands-on resource on GC/MS for organic, analytical, clinical, environmental, and forensic chemists, as well as for students in these specialities.

**Multidimensional Liquid Chromatography: Theory and Applications in Industrial Chemistry and the Life Sciences**, edited by Steven A. Cohen and Mark R. Schure, Hoboken, NJ, USA, John Wiley & Sons, Ltd, 2008, 456 pp., £65.95, ISBN 978-0-471-73847-3

Multidimensional Liquid Chromatography (MDLC) is a very powerful separation technique for analysing exceptionally complex samples in one step. It provides, for example, the high resolution and peak capacity needed for proteomics studies and the independent size and chemical structure selectivity for resolving industrial polymers, nanoparticles and colloidal-sized chemical structures.

This authoritative reference presents a number of recent contributions that define the state of the art and science of MDLC. The topics are assembled within the following sections: theory, columns, instrumentation and methods development (including monolithic columns and ultrahigh pressure LC), life science applications (e.g., peptidomics, biomarkers mapping, and peptides and protein separations), multidimensional separations using capillary electrophoresis for the analysis of complex protein mixtures, and applications of MDLC in industrial polymer and surfactants chemistry. The coupling of MDLC with tandem and time-of-light mass spectrometry systems is particularly illustrated.

The text purposely neither incorporates elements of multidimensional thin-layer chromatography, multidimensional separations in gel media such as those commonly employed for the separation of complex mixtures of proteins, nor the techniques that utilise multidimensional gas chromatography. Some of the same principles apply, particularly in the theory section, but the emphasis is strictly on separations carried out in the liquid phase and by columns, rather than in the gas phase or in planar configurations.

With a practical combination of theory and applications, the book will help readers in using MDLC to solve real-life, real-lab problems. It constitutes a core reference for pharmaceutical and life science researchers and for analytical chemists in various fields of activity and will certainly incentive other practitioners to apply it. Moreover, it is an excellent resource for graduate students and postdoctoral fellows in academic laboratories.

**Particulate Emissions from Vehicles**, by Peter Eastwood, Chichester, UK, John Wiley & Sons, Ltd, 2008, 493 pp., £80.00, ISBN 978-0-470-72455-2

This title addresses a field of increased international interest and research activity; discusses the impact of new legislation globally on the automotive industry; and explains new ways of measuring particle size, number and composition that are currently under development. Although there are already many books on internal combustion engines, on

polluting particles in the atmosphere, and on aerosol science and technology, this excellent book lodges in the region where these three fields intersect.

After a general introduction on air traffic, motor vehicles and the legislative framework, the fundamentals of atmospheric particles are described. These cover the physics and chemistry of particles suspended in a gas, the properties of the atmospheric aerosol, and the particles discharged by motor vehicles. The next two chapters provide extensive overviews on the particle composition and the particle formation, putting the *momentum* on the emission process. Chapters 5 and 6, devoted to the measurement and characterization of particulate emissions, relate various instruments used for their study and quantification and describe how the particles found are composed. The following chapter deals with several disparate technologies that have been pursued in particulate abatement, first among those relating specifically to combustion, including fuel formulation and lubrication, and then those used after particulate formation. The last chapters are devoted, respectively, to the description of gasoline engines, the particles generated by material disintegration (e.g., roads, tyres, brakes, etc.) and public exposure to particles and toxicology. The book closes with a chapter on many recommendations for research, a section on further reading, and the literature cited, cross-referenced against the text, including more than 1,700 references, updated until 2007.

The expert analysis and summary of the state-of-the-art shown in the book, which encompasses the key areas of combustion performance, measurement techniques and toxicology, will appeal to R&D practitioners and engineers working in the automotive industry and related mechanical fields, as well as postgraduate students and researchers of engine technology, air pollution and life/environmental science. The public health aspects will also appeal to the biomedical research community.

**Dictionary of Environmental Science and Technology**, Fourth Edition, by Andrew Porteous, Chichester, UK, John Wiley & Sons, Ltd, 2008, 797 pp., £75.00, ISBN 978-0-470-06194-7

The *Porteous Dictionary* was first published in 1991, when the scientific and technical literature on the field was abundant and the social perception of the impacts of human activities on the environment was taken for granted. Thus, the *Dictionary* made a significant contribution to environmental literacy by providing basic definitions and data, and demonstrating the nature of the issues.

This Fourth Edition is highly updated and expanded with reference to the previous one issued in 2000. It includes more than 4,000 entries on scientific and technical terminology, associated with environmental protection and resource management. The author has combined concise definitions of specific terms with a synthesis of the current knowledge and existing data in more general nature. In addition, the book contains numerous illustrations, a wide range of case studies and extensive cross-references that lead the reader to additional or related information.

The book includes an Appendix with an extensive directory of UK environmental organisations together with web resources, plus some examples from Europe and the US. Another Appendix contains a conversion table for SI and British units. The text has been principally written in basic SI units but, on occasions, concentrations have been given in non-SI units as these are often preserved in current UK legislation or codes of practice. This is a question that will require continued efforts for harmonisation.

This is an essential book for consultation by students and professionals working in the area and, therefore, should be in the library shelves of the corresponding laboratories or institutions.

**Biophysico-Chemical Processes of Heavy Metals and Metalloids in Soil Environments**, edited by Antonio Violante, Pan Ming Huang and Geoffrey Michael Gadd, Hoboken, NJ, USA, John Wiley & Sons, Ltd, 2008, 658 pp., £71.50, ISBN 978-0-471-73778-0

Pollution induced by heavy metals and metalloids in soils is a serious environmental problem because, in comparison with the atmosphere and water, the soil environment has a much lower ability to recover from toxic effects. Their behaviour depends on chemical and physicochemical as well as biological processes and their interactions with microbial activities. Therefore, biogeochemical processes operating in soil environments that affect the fate, behaviour and bioavailability of metals and metalloids are currently an area of active multidisciplinary research.

To contribute to this field, the Division of Chemistry and the Environment of the International Union of Pure and Applied Chemistry (IUPAC) recently approved the creation of an IUPAC-sponsored book series entitled *Biophysico-Chemical Processes in Environmental Systems* to be published by John Wiley & Sons. This book is Volume 1 of this series, and consists of 15 chapters, organised into three parts: Fundamentals of biotic and abiotic interactions of trace metals and metalloids with soil components; transformations and dynamics of metals and metalloids as influenced by soil–root–microbe interactions; and speciation, mobility and bioavailability of metals and metalloids and restoration of contaminated soils.

Contributed by a multidisciplinary group of soil and environmental scientists, the book provides the scientific community with a critical evaluation of the state of the art on the fundamentals of reactions and processes of trace elements in soil environments, their speciation, mobility, bioavailability and toxicity and their impact on the development of innovative restoration strategies. The latest advances in spectroscopy to study various aspects of heavy metal and metalloid interactions with soil inorganic and organic components are also reviewed.

In summary, this book is an essential reference and an important guide to senior undergraduate and graduate students in soil and environmental sciences, including plant nutrition and physiology. It will also serve as a useful resource book for instructors, research scientists, professional consultants, and others working with environmental and ecological systems.

**Environmental Regulatory Calculations Handbook**, by Leo Stander and Louis Theodore, Hoboken, NJ, USA, John Wiley & Sons, Ltd, 2008, 561 pp., £76.50, ISBN 978-0-471-67171-8

In the past decades there has been increased regulatory activity covering all environmental compartments: air, land and water. The present *Handbook* intends to provide, in simple and understandable terms, both background material and technical know-how on the many environmental regulatory topics that exist and may exist in the future in the American context.

The book is divided into ten Parts. Part I provides an overview of the early history of environmental problems. Part II deals with the current regulatory framework. Parts III to

X constitute the heart of the *Handbook*, including problems/solutions with sections on the following US key laws and regulations: Clean Air Act; Clean Water Act, Safe Drinking Water Act; Resource Conservation and Recovery Act; Toxic Substance Control Act; Superfund and Comprehensive Environmental Response, Compensation and Liability Act; Occupational Safety and Health Act; and Pollution Prevention Act.

The *Handbook* provides the reader with nearly 400 solved problems in the regulatory field. One of the key features of this book is that the solutions to the problems are presented in a stand-alone manner. Throughout the book, the problems are laid out in such a way as to develop the reader's technical understanding of the regulatory subject in question. Each problem contains a title, problem statement, reference to the key regulations (where applicable) and data and solution, with the more difficult problems located at or near the end of each problem set.

The Appendix is another feature of this *Regulatory Handbook*. It contains three Sections: A. International regulations; B. ISO 14000, and C. Miscellaneous topics. A brief introduction plus several problems (and solutions) are included in sections A and B. The latter section treats the following topics: In-state regulatory agency names; Federation and pre-emption, Hybrid systems; Electromotive fields (EMPA); Life cycle analysis; and Environmental justice.

Thus, this interesting *Handbook* is primarily intended for professionals in industry and individuals with environmental regulatory responsibilities, but also for individuals with limited technical background.

**State and Evolution of the Baltic Sea, 1952–2005. A Detailed 50-Year Survey of Meteorology and Climate, Physics, Chemistry, Biology, and Marine Environment**, edited by Rainer Feistel, Günther Nausch and Norbert Wasmund, Hoboken, NJ, USA, John Wiley & Sons, Ltd, 2008, 703 pp., £103.50, ISBN 978-0-471-97968-5

The book brings together a comprehensive summary of 50 years observations and findings in the Baltic Sea, basically carried out by the Leibniz Institute for Baltic Sea Research, Warnemünde (Germany), and its precursor institutions. After a general introduction to the oceanography of the Baltic Sea (Chapter 2), the historical development of the monitoring programmes, methods, and techniques is extensively reported (Chapter 3). Within the long-term trends observations, detailed weather statistics reveal a continuous increase in the annual average temperature, in particular from 1987 (8.32°C) until 2004 (8.65°C), attributed to the greenhouse effect (Chapter 4). Mean seasonal cycles and trends of several meteorological key parameters are reported and briefly discussed for the past 50–100 years from various locations in the region, giving special attention to climatic regime shifts (Chapter 5).

The factors determining the surface water currents and the alternation of water inflow and outflow are discussed in Chapter 6. Wind speed, direction, duration, and water depth determine the wave heights that have consequences for environmental and coast protection, safety of maritime transport and installations as well as recreational activities. Formulas, diagrams, and models for the calculation of sea state parameters are given in Chapter 7.

Reports on ice extension, thickness, and duration are perhaps the oldest historical sources on climatic characteristics, as they date back several centuries. In Chapter 8, ice data from 80 observation sites in the Baltic Sea in the period 1956–2005 are described and analysed. Long-term series of directly in situ measured sea-surface temperature (SST) also



exist, however, satellite data have the advantage of a synoptic survey over the different regions and these are presented in Chapter 9.

The characteristics and the effects of the inflow events of North Sea water into the Baltic Sea observed over the last two decades are discussed in Chapter 10. Chapter 11 describes the “Baltic Atlas of Long-Term Inventory and Climatology” (BALTIC), that compiles a vast amount of data on temperature, salinity, oxygen, and nutrients available over  $1 \times 1 \times 10$  m grid cells of the entire Baltic Sea. The first version of this “climate atlas” is published in the digital supplement of this book, freely available for scientific or educational use (Chapter 20). Available, reliable data from the first half of the 20th century were also included in the Baltic Atlas. Therefore, the time series were extended from 1900 to 2005 in several cases. The BALTIC data set is replenished by comprehensive time series over 50 or 100 years of sea level, ice cover, solar radiation, weather data, and inflow data from the Belt Sea. For convenience, Chapter 20 describes the most relevant physical and chemical parameters, their measuring units, and conversion equations.

Eutrophication has been identified as the main threat for the Baltic Sea. The loads and the environmental consequences of the different forms of nutrient elements (dissolved organic and inorganic nitrogen, particulate organic nitrogen and total nitrogen) in the basin are reviewed in Chapter 12. In addition to nutrients, coastal areas are also endangered by anthropogenic inputs of toxic substances, notably trace metals. An overview of the heavy metal load entering the Baltic Sea, via atmospheric and riverine inputs, and the changing trends in surface and deep waters of the different regions is offered in Chapter 13. Undisturbed and datable sediment cores from the central and western depositional basins have been studied for the reconstruction and comparison of the pollution history of the Baltic Sea. In Chapter 14, the patterns in the vertical distributions of heavy metals (Cu, Pb, Zn, Hg) and organic pollutants (PCBs, DDTs, HCHs) from the beginning of the 20th century are shown and discussed.

Chapters 15 to 17 deal with the spatial and temporal distribution patterns of the phytoplankton, macrophyto and zoobenthos. About 100,000 data, spanning from 1839 to 2006, have been recorded and combined in a common database. The fish stock development under the hydrogeographic conditions as well as the history of fisheries and its management are covered in Chapter 18. Finally, the state-of-the-art model with its sophisticated tools, the systematic difficulties, and the progress made in the last decades from the fundamental physical laws to the models of biochemical food webs, is reviewed in Chapter 19. An accompanying CD-ROM provides useful supplementary material such as oceanographic reference data: long-term observational data on weather, sea level, ice cover and plankton, hydrochemical and hydrophysical data; and selected colour figures of the book.

Besides those involved or interested in Baltic Sea research, the book serves as a reference source for students and scientists in oceanography, geosciences, marine biology and marine policy. The various aspects addressed in the different chapters may contribute to our understanding of water exchange processes, eutrophication, climate impacts, and the interpretation of long-term trends caused by anthropogenic influences.

**Environmental Chemistry of Aerosols**, edited by Ian Colbeck, Oxford, UK, Blackwell Publishing, 2008, 255 pp., £65.00, ISBN 978-1-4051-3919-9

Aerosol particles are ubiquitous in the earth's atmosphere and are central to many environmental issues such as climate change, stratospheric ozone depletion and air quality.

In urban environments, aerosol particles can affect human health through their inhalation. Understanding the ways in which aerosols behave, evolve and exert these effects requires knowledge of their formation and removal mechanisms, transport processes, as well as their physical and chemical characteristics.

Chapter 1 summarises key physical and chemical properties of atmospheric aerosols, while Chapters 2 and 3 describe the key processes in the formation of new atmospheric particles and their subsequent growth to larger sizes. Recent studies have shown that atmospheric aerosols are a complex mixture and that the organic fraction can comprise hundreds of species, representing a wide variety of compound classes and origins. This is discussed in Chapter 4, while Chapter 5 considers the role of metals in atmospheric aerosol chemistry. Chapter 6 provides an overview of aerosol–water vapour interactions and equilibrium thermodynamics. The final two chapters offer examples of environmental aerosols. Thus, Chapter 7 gives a general sense of the behaviour of the stratospheric aerosol layer and its impact on environmental chemistry and Chapter 8 describes aerosol in remote locations and highlights the need for harmonised procedures worldwide.

This book intends to bring together the state-of-the-art knowledge of environmental aerosol chemistry, adding another title to those previously published by Blackwell Publishing in the field of atmospheric research (see *IJEAC* **86**, 1176, 2006; **88**, 595, 2008). The book presents a coherent structure on which to base the study of environmental chemistry of aerosols. It is intended to provide an authoritative review to address the needs of both graduate students and active researchers in the field of atmospheric chemistry and to be used as a resource, identifying the themes and relevant concepts required.

**The Toxicology of Fishes**, edited by Richard T. Di Giulio and David E. Hinton, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2008, 1071 pp., £79.00, ISBN 0-4152-4868-X

*Toxicology of Fishes* is the most comprehensive and authoritative overview on the subject, incorporating the latest developments in the field. Organised into four units, Unit I, 'General Principles', contains Chapters 1 to 6. Following the Introduction, Chapter 2 is devoted to the bioavailability of chemical contaminants in aquatic systems. When uptake has occurred, distribution within the individual fish must be considered, and this is the subject of Chapter 3, 'Toxicokinetics in Fishes'. The fourth chapter is concerned with biotransformations in fishes and, among other aspects, covers the potential bioactivation of compounds into toxic forms and their conjugation and removal. Chapter 5, 'Molecular Mechanisms of Toxicity', provides coverage of how the processes by toxic states are achieved. Completing this first unit is an additional chapter on mechanisms, particularly those arising through oxidative stress.

Unit II, 'Key Target Systems and Organismal Effects', comprises Chapters 7 to 13. Chapter 7, 'Liver Toxicity' covers the microscopic anatomy of the organ, important aspects of the liver physiology in fishes, and morphological, biochemical and functional aspects of toxic injury and its consequences. Chapter 8, 'The Osmoregulatory System', covers the anatomy and physiology of the gill and its perturbations by metals and other aquatic pollutants. Chapter 9, 'Toxic Responses of the Fish Nervous System', provides a description of the central nervous system of fishes and describes a variety of toxic responses, some morphological and others physiological. Chapter 10, 'The Endocrine System', describes the endocrine system of fishes and its toxicity, and receptor-mediated mechanisms and the effect of contaminants on hormone function are covered in detail.

Chapter 11 describes the immune system of fish, a known target for certain toxicants that can directly affect the individual's host defence mechanisms. How these toxic responses arise and their significance are the subjects of this chapter. Chemical carcinogenesis of fishes is the subject of Chapter 12, in which a brief history of this interesting aspect of chronic toxicity is provided followed by coverage of molecular aspects of carcinogenesis. Both laboratory and field studies are reviewed. The final chapter in this section is a treatment of toxicity resistance.

Unit III, 'Methodologies and Applications', is an assemblage of five chapters. Chapter 14, 'Exposure Assessment and Modeling in the Aquatic Environment', is followed by a chapter on fish toxicity studies which reviews methods and approaches for determining acute and chronic toxicities in various laboratory applications. Responses that indicate exposure, adverse effects and genetic susceptibility are included in Chapter 16, 'Biomarkers'; information provided here includes descriptions of a broad array of biomarkers and examples of their application in biomonitoring. In Chapter 17, 'Aquatic Ecosystems for Ecotoxicological Research: Considerations and Design Analysis for Fish', the importance of research at higher, ecologically relevant levels of biological organisation is described, and examples of appropriate designs are provided. Finally, Chapter 18, 'Ecological Risk Assessment', deals with the translation of ecotoxicological research into environmental management and policy.

In Unit IV, 'Case Studies', a group of seven chapters provides ample examples of how the principles and approaches presented in earlier units are actually deployed in studies, particularly in the field; for example, Chapter 19 presents an analysis of mining and effects on fish in a Montana river. The study combines chemistry, biological responses, and ecotoxicological findings. In Chapter 20, the effects of synthetic pyrethroid compounds in fish are covered. In Chapter 21, mechanistic insight into the early-life-stage toxicity of certain chemicals is used to assess risks to Great Lakes fish. Chapter 22 is concerned with the effects of polycyclic aromatic hydrocarbons in fish from Puget Sound, Washington. Chapter 23 examines the effects of the *Exxon Valdez* oil spill on Pacific herring in Prince William Sound. Chapter 24 addresses the pulp and paper mill effects studied in the streams of Canada; the authors present a consideration of various indicators for the health of surface waters downstream of paper mills. Chapter 25 provides a detailed review of the estrogen mimicking agents released from treated sewage effluent and their effects on fish inhabiting rivers in England.

A great deal of new information has been assembled and thoroughly reviewed in this reference book, providing cohesive coverage and integrating new findings with existing concepts in the field. The resultant toolkit, amply illustrated in this volume, is a suite of validated methods that are now used to assess chemical exposures and effects or responses arising from various forms of chronic toxicity at all levels of biological organisation. *Toxicology of Fishes* represents a very important teaching tool to introduce new students to the field, and will become a key source of useful information for experienced authors and investigators alike.

**Toxicological Risk Assessment of Chemicals: A Practical Guide**, by Elsa Nielsen, Grete Østergaard and John Christian Larsen, New York, USA: Informa Healthcare, 2008, 418 pp., £79.00, ISBN 978-0-8493-7265-0

Unlike many existing books on toxicology that cover either toxicity of specific substances or toxicity of chemicals on particular organ systems, the present book sets out the principle

activities of conducting a toxicological risk assessment, principally including international approaches and methods for the risk assessment of chemical substances. The basic concepts of toxicological risk assessment form the core of the book. The book is mainly concerned with industrial chemicals, but other chemical use categories, for example pesticides, food additives, veterinary drugs, etc., are also mentioned in recognition of the wide use of chemicals for different purposes.

The book starts with a description of the various institutions, agencies and programmes involved in chemicals regulation, through the United Nations system (WHO) and the OCDE, and the major federal bodies of the US and the EU. National programmes and methods are mentioned, but only to a very limited extent. The following chapter focuses on the collection of data from international bodies, which is then used for hazard assessment in relation to human health. The various toxicological endpoints and the associated test methods used in hazard assessment (e.g., toxicokinetics, acute toxicity, irritation and corrosion, sensitization, repeated dose toxicity, mutagenicity, carcinogenicity, reproductive toxicity, endocrine disruption and probabilistic methods) are also described extensively, always with reference to the guidelines proposed by the WHO, the OCDE, the US-EPA and the EU. The process of standard setting for threshold and non-threshold adverse health effects is addressed in detail in the following chapters. Then, the exposure assessment and the risk characterization approaches adopted by the various bodies considered throughout the book, and the development of regulatory standards for air quality, drinking water and food (e.g., the Tolerable Daily Intake) are described. The book finally summarises the basic concepts of interaction of chemicals in mixtures and discusses various approaches to assess the risk of such mixtures. New developments in these methodologies are also mentioned.

The aim of this book is to provide the reader with a useful guide and a valuable tool for working as a toxicologist and risk assessor in the field of human health risk assessments. This book will definitely serve as a fundamental basis for students in health and environmental sciences and as a useful guide for professionals involved in toxicological risk assessments of chemicals in their daily work.

**Environmental Impact of Polynuclear Aromatic Hydrocarbons**, edited by Chimezie Anyakora, Kerala, India, Research Signpost, 2007, 401 pp., USD158.00, ISBN: 978-81-308-0188-9

This book is an attempt to assemble several experts in the field to provide up-to-date information on different areas of concern of polycyclic aromatic hydrocarbons (PAHs), hence allowing their impact on the environment to be better appreciated.

The book contains 14 chapters which focus on: Chemistry of polynuclear aromatic hydrocarbons; Toxicity, genotoxicity and carcinogenicity of PAHs, including epidemiological studies; Toxicokinetics of PAHs, with special emphasis on the 16 EPA priority PAHs; Bioremediation of PAHs in contaminated soils; Structure–(carcinogenic)activity relationships of PAHs; Biomarkers of PAHs exposure, with particular reference to the use of urinary 1-hydroxypyrene; Embryotoxicity of PAHs, including morphological effects, reduced growth, reduced predator avoidance and prey capture, depressed immune function, genetic changes, and population declines; Impact of PAHs on marine organisms in polluted sites across the world; Application of PAHs in chemical fingerprinting; Extraction and sample preparation; Analysis of PAHs with HPLC, gas chromatography and micellar electrokinetic chromatography.

The different chapters, written by scientists who have good experience in the field, combine the existing body of knowledge with practical research findings. Therefore, the book will help students, professors and scientists to get deeper insight on the subject.

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