## TABLE OF CONTENTS

- Chapter 1. Introduction: What is Aquatic Toxicology?
  - 1.1. The History of Aquatic Toxicology
  - 1.2. The Main Present and Future Challenges
  - 1.3. What is Measured

#### **Chapter 2. What Causes Aquatic Contamination?**

- o 2.1. Introduction
- o 2.2. Metals, Metalloids, and Organometallic Compounds
- 2.3. Other Inorganic Compounds, Including Factors Causing Eutrophication
- o 2.4. Organic Compounds
- 2.5. Nanomaterials
- o 2.6. Radiation
- 2.7. Genetic Modification

#### **Chapter 3. Principles of Water Purification**

- o 3.1. Principles of wastewater treatment
- o 3.2. Disinfection Steps for Generating Household Water
- 3.3. Sludge Treatment

#### **Chapter 4. Sources and Transport of Chemicals in Aquatic Systems**

- 4.1. The Major Sources of Pollutants
- o 4.2. Transport of Pollutants in the Environment

## Chapter 5. The Most Important Experimental Designs and Organisms in Aquatic Toxicology

- 5.1. Model Organisms Used
- 5.2. Micro- and Mesocosms
- 5.3. Ecosystem Manipulations
- 5.4. Biomonitoring

#### **Chapter 6. Factors Affecting the Bioavailability of Chemicals**

- o 6.1. Introduction
- o 6.2. Pharmacological Bioavailability
- 6.3. Environmental Bioavailability

#### **Chapter 7. Chemical Uptake by Organisms**

- o 7.1. Introduction
- o 7.2. The Uptake of Ionic (Hydrophilic) Compounds

7.3. The Uptake of Lipophilic Compounds

### **Chapter 8. Chemical Distribution in Organisms**

- 8.1. Introduction: Distribution of Chemicals in Organisms
- 8.2. Storage Sites of Chemicals in Organisms
- 8.3. Cellular Distribution of Chemicals

#### **Chapter 9. Detoxification**

- o 9.1. Biotransformation of Organic Compounds
- o 9.2. Detoxification by Forming Non-Harmful Complexes
- o 9.3. Detoxification by Compartmentalization

#### **Chapter 10. Excretion of Compounds from Organisms**

- o 10.1. Introduction
- 10.2. Cellular Excretion
- o 10.3. Excretion from Gills
- 10.4. Excretion from the Kidney and Other Excretory Organs
- 10.5. Excretion in Bile Via the Intestine
- 10.6. Excretion From Multicellular Plants (Including Algae)

### **Chapter 11. Effects on Organisms**

- 11.1. 'Omics in Aquatic Toxicology—Ecotoxicogenomics
- 11.2. Genotoxicity
- 11.3. Oxidative Stress
- o 11.4. Effects on Reproduction
- 11.5. Neurotoxicity
- 11.6. Effects on Energy Metabolism
- 11.7. Membrane Effects
- 11.8. Apoptosis and Necrosis
- 11.9. Immunotoxicology
- o 11.10. Effects on Development
- o 11.11. Teratogenesis and Carcinogenesis
- 11.12. Behavioral Effects

#### Chapter 12. Bioindicators and Biomarkers

- 12.1. Bioindicators
- 12.2. Biomarkers

#### **Chapter 13. Interactions between Chemicals**

- 13.1. Lack of Interacting Effects (Additive Toxicity)
- o 13.2. Agonism (potentiation, synergism)
- o 13.3. Antagonism
- 13.4. Has Potentiation or Inhibition of Toxicity by Chemical Interactions been Demonstrated in Natural Environments?

## **Chapter 14. Acute and Chronic Toxicity**

- o 14.1. Introduction
- 14.2. Differentiating Between General Stress Responses and Specific Acute Responses to Pollutants
- 14.3. Time Courses of Toxicant Responses
- o 14.4. What Signifies a Chronic Toxicant Response?

## Chapter 15. Interactions Between Natural Environmental Factors and Toxicity

- o 15.1. Temperature
- o 15.2. Oxygen
- o 15.3. Salinity
- o 15.4. Other Abiotic Stresses
- o 15.5. Competition and Predation

## **Chapter 16. Effects of Chemicals on Aquatic Populations**

- o 16.1. Introduction
- o 16.2. Epidemiology
- o 16.3. Demographic Effects
- 16.4. Population Genetics

# **Chapter 17. Effects of Chemicals on Aquatic Communities and Ecosystems**

- o 17.1. Introduction
- o 17.2. Community Ecotoxicology
- 17.3. Ecosystem Ecotoxicology

#### **Chapter 18. Modeling Toxicity**

- o 18.1. Introduction
- o 18.2. Risk Assessment
- o 18.3. Models with Lethality as an End Point
- 18.4. Toxicokinetic Modeling
- o 18.5. QSAR
- 18.6. Modeling The Properties of Water Affecting Toxicity (of Metals)