

Preface

Climate change and its far-reaching impacts compel us to question the value we give to nature and the human relationship with it. Water touches many subject areas that are important in our daily lives. At some point, it influences what we eat and drink, and how we access it. Therefore, we decided to edit a book on climate change and water toxins that includes climate trends and effects, physicochemical measurements, water quality parameters, marine and freshwater toxins, toxin detection, phytoplankton and zooplankton, invertebrates and fish.

There is no historical record to compare the amounts of toxins that are existent now and a century or more ago. Toxins are identifiable as a result of modern science, and thereby their presence, structure or levels in food have only been known for a short time. The use of mass spectrometers is rather recent, and the existence of certified standards only goes back a few years. Therefore, it is very complex to establish a solid link, using the scientific method, between climate change and toxins. But it is clear that something is happening – not only because modern technology allows us to track the changes easily but also because the trend is that more and different toxins are appearing in new locations and products.

Although climate change is frequently related to extreme weather episodes and rising sea levels in the media, a lesser known fact is that new toxins will appear in areas and products where they presently do not occur.

Despite the fact that scientific evidence may not always be available to prove or disprove perceived potential harms of climate change and their links with toxins, this book offers quantitative compelling evidence of the many complex interactions that must be considered from primary toxin producers up the food chain to humans.

In the case of marine toxins, although ballast water, international trade and so on may be a source of new intoxications and blooms, it is very clear that some regions are hot spots for many compounds. Likewise, eutrophication of lakes is a source of cyanobacterial blooms. The United States had never had a diarrheic episode until Texas witnessed one a few years ago. Europe had never had a tetrodotoxin intoxication from shellfish until a few years ago; ciguatoxin intoxications are becoming frequent after ingestion of fish from the Southern European Atlantic Ocean; and aerosols with ostreocin from *Gambierdiscus* are now a problem in Mediterranean beaches every year. A similar problem is being observed in freshwater, as the expansion of cyanobacteria and their toxins has become a worldwide problem; this adds to the deleterious effect of human pollution in drinking water. Something is happening that was not previously reported and may be explained by increased water temperatures in both lakes and seas.

This book intends to cover the main aspects of the possible relation between climate change and freshwater and marine toxins: prediction models and management of harmful algal blooms; influence on food security and food production; legislation; drinking water and cyanobacteria blooms; and sex change in toxin vectors.

This last topic, sex change, serves as an introduction to a new area of research – the role of climate change in basic physiological processes. Very little information is currently available on this subject.

This book has brought together a group of international experts. Contributing authors expand the framework of possibilities for appropriate assessment of climate change impacts on marine and freshwater toxins, which in turn directly impacts the natural environment, human health and sustainability.

The book is an excellent introduction to this complex topic or a useful supplement to courses in the field of ecotoxicology. In short, it is a must-read book for all who are interested in toxins and how climatic conditions can modify them – from the general public or students to toxicologists, food technologists, pharmacologists, analytical chemists, ecologists, biologists, veterinarians and physicians.

Last, and by no means least, we thank all the authors. They were not only very generous with their time, and were also bold enough to commit to write a chapter on an especially difficult topic and use their prestigious names in their chapters. For this, we are greatly thankful to all of them. We hope the book helps in understanding the potential risks caused by climate in a particularly sensitive area: food and drinking water.