

Preface

Continuous use of pesticides has led to their widespread presence in soil, sediment, and aquatic environments, which poses a threat to non-target crops, animals, humans, and ecosystems. Pesticides undergo various pathways once they enter the environment, including transformation/degradation, sorption-desorption, volatilization, uptake by plants, runoff into surface waters and transport into groundwater. The increasing awareness of the risks to humans related to pesticides has forced us to limit their application, to design new, more environmentally-friendly agricultural chemicals, and to develop effective strategies, including physicochemical and biological technologies to clean up environments contaminated with pesticides. Physicochemical approaches include membrane filtration, adsorption, incineration, photo-catalysis, ozonation/UV-irradiation, fenton degradation, among others. Among the biological technologies, which include attenuation, biostimulation and biodegradation, the last one seems to be the most promising for the removal of pesticides and their residues from environment. Moreover, the advanced molecular approaches, enzyme engineering, and emerging materials will provide better tools for the degradation of pesticides by means of exploring the novel research perspectives. Reaching a great combination of the recent studies on degradation of pesticides, this book is one of the most practical and up-to-date references available on the subject. This allows the knowledge of pesticide degradation accessible to a wider range of audiences, and also introduces new thoughts and new methods for researchers, practitioners in dealing with pesticide residues or related issues. The fundamental concepts, experimental process, statistical analyses, and comprehensive discussions are covered in detail, providing the readers a systematic understanding of the field.