

Preface

The utilization of marine resources is commonly considered inexpensive and abundant, with great interest to develop biological and biomedical applications. Chitosan is produced from chitin, which is a natural polysaccharide composed of randomly distributed β -(1-4)-linked D-glucosamine (deacetylated unit) and N-acetyl-D-glucosamine (acetylated unit). Chitin is a long-chain polymer comprising N-acetylglucosamine, a derivative of glucose, and is found ubiquitously. It is the main component of the cell walls of fungi, the exoskeletons of arthropods, such as crustaceans (e.g., crabs, lobsters, and shrimps) and insects, the radulas of mollusks, and the beaks and internal shells of cephalopods, including squid and octopuses. However, marine crustacean shells are widely used as primary sources for the production of chitosan. Crab and shrimp are important marine species of great commercial importance in the tropical and subtropical waters of the Pacific, Atlantic, and Indian oceans. Chitin and chitosan have been widely used for various biological and biomedical applications during the last two decades, owing to their unique properties. However, extensive research on the applicability of chitin and chitosan was limited due to their poor solubility. The current research trends focus mainly on the increase in solubility of chitin and chitosan through the addition of chemical groups at the molecular level. Modified chitin and chitosan derivatives have several applications including biological and biomedical.

In recent times, chitin and chitosan derivatives have been achieving a strong market position attracting various marine researchers and the consumers as well. Chitin and chitosan derivatives are currently receiving a great deal of attention with regard to medical and pharmaceutical applications owing to their interesting properties that make them suitable for use in the biomedical field, such as biocompatibility, biodegradability and nontoxicity, analgesic, antitumor, hemostatic, hypocholesterolemic, antimicrobial, and antioxidant properties.

This book contains various relevant topics such as modification of chitin and chitosan derivatives and their characterization as well as applications toward drug discovery and delivery in preliminary research. These topics can provide a platform to develop various biotechnology industries. The book covers the modification of chitin and chitosan derivatives and the problems associated with it together with probable solutions for the same.

- Chitin and chitosan have a wide range of bioactivity, which may be utilized only once the modification is accomplished in an appropriate manner. Part I of this book provides the basic information about the synthesis and characterization of a variety of chitin and chitosan derivatives.
- Part II deals with the characterization of modified chitin and chitosan derivatives, which forms an important basis for the biological application of these polymers. This part also discusses activities such as biological, specifically antioxidant, anti-inflammatory, anticarcinogenic, antiviral, and anticoagulant and antimicrobial.
- Part III includes the biomedical application of the chemically modified as well as composite materials of chitin and chitosan derivatives in tissue engineering, drug delivery, and wound dressing applications.

The contributors are from various countries (Europe, India, Japan, Korea, Vietnam, Africa, and Malaysia) and have contributed chapters at an excellent standard. This book is a must-read for novices and experts in the fields of biotechnology, chemical sciences, natural products, materials science, pharmaceutical science, nutraceutical, and biomedical engineering sciences. It will be useful for further research in the scientific and industrial arenas.

I would like to acknowledge CRC Press, Taylor & Francis Group, for their encouragement and suggestions to get this wonderful compilation published. I would also like to extend my sincere gratitude to all the contributors for providing help, support, and advice to accomplish this task. I strongly recommend this book for marine biomaterials researchers/students and hope that it helps them to enhance their understanding in this field.

Se-Kwon Kim

Busan, South Korea