

ALGINATES

Applications in the
Biomedical and
Food Industries

Edited by
Shakeel Ahmed

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Alginates

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This book
is
dedicated to:

The woman who raised me—Amma

The woman who guided me—Prof Saiqa Ikram

*The women who loved me—Nasreen Akhter, Parveen Akhter, Shamim
Akhter, and Naida Bhabhi*

The men who supported me during ups and downs of my life—

Mohd Shabbir, Abdul Hamid, Mohd Aslam, and Naseeb Bajraan

*The friends who stood with me—Wahid ul Rehman, Faheem Rasool,
Aamir Mushtaq, and Maqbool Bajjar*

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Preface

Alginates are linear biopolymers consisting of 1,4-linked β -D-mannuronic acid and 1,4 α -L-guluronic acid residues. These groups of naturally occurring polysaccharides, which are derived from brown algal cell walls and several bacterial strains, have found numerous applications in biomedical sciences and pharmaceutical and food industries. Although there are currently many books available with chapters referencing alginates, this is the first of its kind solely devoted to their properties, modification, and characterization, with particular emphasis on their applications in the biomedical and food industries.

The wide-ranging topics discussed in this book are as follows. Chapter 1 gives an overview of alginates, their structures, and properties, and a detailed account of the modification of alginates, various characterization techniques, and methods of processing is given in chapter 2. Chapter 3 covers the dynamic properties of alginates and their innovative application in various materials, namely, the nanomaterial or the polymer. Chapters 4 and 5 discuss the biomedical applications of alginates. The focus of chapter 6 is the wide use of alginates in pharmaceutical and biomedical industries and that of chapter 7 is the evolution of alginate materials in restorative dentistry. Chapter 8 discusses applications of different cross-linked alginate networks, their microspheres, and hydrogel in relation to drug encapsulation and delivery processes and includes a brief introduction of the chemistry and pharmaceutical chemistry of alginates.

In chapter 9, biomedical applications of alginates—particularly wound care application in the various forms of alginate-based wound dressings—are discussed. Chapter 10 discusses the present use and future potential of alginates as a tool in drug formulation and regenerative medicine. Chapters 11, 12, and 13 focus on food packaging, beverage industry, and comestible applications of alginates, respectively. The last chapter of the book discusses the current uses and future prospects of alginates in food packaging and biomedical applications.

I hope that this book will be helpful to research scholars and scientists working in the area of alginates. I hope that it will also be helpful to beginners and undergraduate and graduate students, as it gives a full description of alginate structural details, history, properties, processing, etc. I am very grateful to the contributors of this book for their valuable contributions and Scrivener-Wiley for its publication.

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