

# Marine Biomaterials Characterization Isolation And Applications

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**Springer Handbook of Marine Biotechnology** - Se-Kwon Kim  
2015-01-21

This Springer Handbook provides, for the first time, a complete and consistent overview over the methods, applications, and products in the field of marine biotechnology. A large portion of the surface of the earth (ca. 70%) is covered by the oceans. More than 80% of the living organisms on the earth are found in aquatic ecosystems. The aquatic systems thus constitute a rich reservoir for various chemical materials and (bio-)chemical processes. Edited by a renowned expert with a longstanding experience, and including over 60 contributions from leading international scientists, the Springer Handbook of Marine Biotechnology is a major authoritative desk reference for everyone interested or working in the field of marine biotechnology and bioprocessing - from undergraduate and graduate students, over scientists and teachers, to professionals. Marine biotechnology is concerned with the study of biochemical materials and processes from marine sources, that play a vital role in the isolation of novel drugs, and to bring them to industrial and pharmaceutical development. Today, a multitude of bioprocess techniques is employed to isolate and produce marine natural compounds, novel biomaterials, or proteins and enzymes from marine organisms, and to bring them to applications as pharmaceuticals, cosmeceuticals or nutraceuticals, or for the production of bioenergy from marine sources. All these topics are addressed by the Springer Handbook of Marine Biotechnology. The book is divided into ten parts. Each part is consistently organized, so that the handbook provides a sound introduction to marine biotechnology - from historical backgrounds and the fundamentals, over the description of the methods and technology, to their applications - but it can also be used as a reference work. Key topics include: - Marine flora and fauna - Tools and methods in marine biotechnology - Marine genomics - Marine microbiology - Bioenergy and biofuels - Marine bioproducts in industrial applications - Marine bioproducts in medical and pharmaceutical applications - and many more...

**Bioceramics and Biocomposites** - Iulian Antoniac 2019-03-26

Provides comprehensive coverage of the research into and clinical uses of bioceramics and biocomposites. Developments related to bioceramics and biocomposites appear to be one of the most dynamic areas in the field of biomaterials, with multiple applications in tissue engineering and medical devices. This book covers the basic science and engineering of bioceramics and biocomposites for applications in dentistry and orthopedics, as well as the state-of-the-art aspects of biofabrication techniques, tissue engineering, remodeling, and regeneration of bone tissue. It also provides insight into the use of bionanomaterials to create new functionalities when interfaced with biological molecules or structures. Featuring contributions from leading experts in the field, *Bioceramics and Biocomposites: From Research to Use in Clinical Practice* offers complete coverage of everything from extending the concept of hemopoietic and stromal niches, to the evolution of bioceramic-based scaffolds. It looks at perspectives on and trends in bioceramics in endodontics, and discusses the influence of newer biomaterials use on the structuring of the clinician's attitude in dental practice or in orthopedic surgery. The book also covers such topics as biofabrication techniques for bioceramics and biocomposites; glass ceramics: calcium phosphate coatings; brain drug delivery bone substitutes; and much more. Presents the biggest trends in bioceramics and biocomposites relating to medical devices and tissue engineering products. Systematically presents new information about

bioceramics and biocomposites, developing diagnostics and improving treatments and their influence on the clinicians' approaches. Describes how to use these biomaterials to create new functionalities when interfaced with biological molecules or structures. Offers a range of applications in clinical practice, including bone tissue engineering, remodeling, and regeneration. Delineates essential requirements for resorbable bioceramics. Discusses clinical results obtained in dental and orthopedic applications. *Bioceramics and Biocomposites: From Research to Use in Clinical Practice* is an excellent resource for biomaterials scientists and engineers, bioengineers, materials scientists, and engineers. It will also benefit mechanical engineers and biochemists who work with biomaterials scientists.

**Biopolymers and Their Industrial Applications** - Sabu Thomas  
2020-10-31

*Biopolymers and Their Industrial Applications: From Plant, Animal, and Marine Sources to Functional Products* is a detailed guide to the use of biopolymers for advanced applications across a range of key industries. In terms of processing and cost, bio-based polymers are becoming increasingly viable for an ever-broadening range of novel industrial applications. The book begins with an overview of biopolymers, explaining resources, demands, sustainability, life cycle assessment (LCA) modeling and simulation, and classifications. Further in-depth chapters explore the latest techniques and methodologies for isolation and physicochemical characterization, materials selection, and processing for blends and composites. Chapters 6 to 14 each focus on the preparation and applications of biopolymers in a specific industrial area, including food science and nutraceuticals, medicine and pharmaceuticals, textiles, cosmeceutical, packaging, adhesives and automotive, 3D printing, super capacitor and energy storage devices, and environmental applications. The final chapter compares and analyzes biopolymers alongside synthetic polymers, also offering valuable insight into social, economic, and environmental aspects. This is an essential resource for those seeking to understand, research, or utilize biopolymers in industrial applications. This includes researchers, scientists, and advanced students working in biopolymers, polymer science, polymer chemistry, biomaterials, materials science, nanotechnology, composites, and biotechnology. This is a highly valuable book for scientists, R&D professionals, designers, and engineers across multiple industries and disciplines, who are looking to utilize biopolymers for components and products. Introduces a broad range of industrial application areas, including food, medicine, textiles, cosmetics, packaging, automotive, 3D printing, energy, and more. Offers an industry-oriented approach, addressing challenges and explaining the preparation and application of biopolymers for functional products and parts. Considers important factors such as resources, classification, sustainability, and life cycle assessment (LCA) modeling and simulation. Compares and analyzes biopolymers alongside synthetic polymers, also offering valuable insight into social, economic, and environmental aspects.

**Marine Sponges: Chemicobiological and Biomedical Applications** - Ramjee Pallela 2016-11-17

The main focus of this book entitled is to provide an up-to-date coverage of marine sponges and their significance in the current era. This book is an attempt to compile an outline of marine sponge research to date, with specific detail on these bioactive compounds, and their pharmacological and biomedical applications. The book encompasses twenty chapters covering various topics related to Marine Sponges. Initial couple of

chapters deal about the worldwide status of marine sponge research, the recent findings regarding dynamics of sponges, and several interesting research areas, that are believed to be deserving of increased attention. Variety of sponges, their toxicology, metagenomics, pharmaceutical significance and their possible applications in biomedicine has been discussed in detail. The second half of this part includes chapters on chemical ecology of marine sponges followed by the discussion on importance of bioeroding sponges in aquaculture systems. The following four chapters of the book deal majorly with the chemical molecules of marine sponges. In the fifth chapter, marine sponge-associated actinobacteria and their physicochemical properties have been discussed followed by their bioactive potential. The biological application of marine sponges has been presented in later chapters with the classification of biologically active compounds being explored in detail. The second half of the book presents the vast repertoire of secondary metabolites from marine sponges, which include terpenoids, heterocycles, acetylenic compounds, steroids and nucleosides. Further, the bioactive potential of these compounds has also been discussed. One of the constituent chapter elaborates the bioactive alkaloids from marine sponges namely, pyridoacridine, indole, isoquinolene, piperidine, quinolizidine, steroidal and bromotyrosine alkaloids isolated from them. In the next couple of chapters, important sponge polymers and the anticancer effects of marine sponge compounds have been presented. The most interesting aspect of sponge biology is their use in biomedical arena. An effort has been made in this book, to cover the major constituents of sponges and their biomedical potentials. The major portion of sponge body is composed of collagen and silica and used in tissue engineering as scaffold material. This part of the book compiles chapters delineating the isolation of sponge biomaterials including collagen and their use in medical diagnostics. Overall, this book would be an important read for novice and experts in the field of sponge biology.

**Seaweed Biomaterials** - Sabyasachi Maiti 2018-12

**Encyclopedia of Marine Biotechnology** - Se-Kwon Kim  
2020-08-04

A keystone reference that presents both up-to-date research and the far-reaching applications of marine biotechnology. Featuring contributions from 100 international experts in the field, this five-volume encyclopedia provides comprehensive coverage of topics in marine biotechnology. It starts with the history of the field and delivers a complete overview of marine biotechnology. It then offers information on marine organisms, bioprocess techniques, marine natural products, biomaterials, bioenergy, and algal biotechnology. The encyclopedia also covers marine food and biotechnology applications in areas such as pharmaceuticals, cosmeceuticals, and nutraceuticals. Each topic in Encyclopedia of Marine Biotechnology is followed by 10-30 subtopics. The reference looks at algae cosmetics, drugs, and fertilizers; biodiversity; chitins and chitosans; aeropylsinin-1, toluquinol, astaxanthin, and fucoxanthin; and algal and fish genomics. It examines neuro-protective compounds from marine microorganisms; potential uses and medical management of neurotoxic phycotoxins; and the role of metagenomics in exploring marine microbiomes. Other sections fully explore marine microbiology, pharmaceutical development, seafood science, and the new biotechnology tools that are being used in the field today. One of the first encyclopedic books to cater to experts in marine biotechnology. Brings together a diverse range of research on marine biotechnology to bridge the gap between scientific research and the industrial arena. Offers clear explanations accompanied by color illustrations of the techniques and applications discussed. Contains studies of the applications of marine biotechnology in the field of biomedical sciences. Edited by an experienced author with contributions from internationally recognized experts from around the globe. Encyclopedia of Marine Biotechnology is a must-have resource for researchers, scientists, and marine biologists in the industry, as well as for students at the postgraduate and graduate level. It will also benefit companies focusing on marine biotechnology, pharmaceutical and biotechnology, and bioenergy.

**Marine Composites** - Richard Pemberton 2018-08-20

Marine Composites: Design and Performance presents up-to-date information and recent research findings on the application and use of advanced fibre-reinforced composites in the marine environment. Following the success of their previously published title: Marine Applications of Advanced Fibre-reinforced Composites which was published in 2015; this exemplary new book provides comprehensive information on materials selection, characterization, and performance. There are also dedicated sections on sandwich structures, manufacture, advanced concepts, naval architecture and design considerations, and various applications. The book will be an essential reference resource for designers, materials engineers, manufactures, marine scientists, mechanical engineers, civil engineers, coastal engineers, boat manufacturers, offshore platform and marine renewable design engineers. Presents a unique, high-level reference on composite materials and their application and use in marine structures. Provides comprehensive coverage on all aspects of marine composites, including the latest advances in damage modelling and assessment of performance. Contains contributions from leading experts in the field, from both industry and academia. Covers a broad range of naval, offshore and marine structures.

**Polysaccharide Nanoparticles** - Jayachandran Venkatesan  
2022-01-11

Polysaccharide Nanoparticles: Preparation and Biomedical Applications provides detailed information on polysaccharides nanoparticles in terms of their synthesis and applications. Naturally occurring polysaccharides are widely used as food materials, particularly in Asia. Different kinds of polysaccharide materials are available from nature with various resources such as crustaceans and algae. The exploration and exploitation of polysaccharides nanoparticles from natural resource is at the heart of this book, which also explores the synthesis, preparation and applications of polysaccharides nanoparticles for tissue engineering and food applications. This is an important reference for materials scientists and bioengineers who are looking to gain a greater understanding on how polysaccharides nanoparticles are being used for a variety of biomedical applications. Explains the major synthesis and preparation methods of polysaccharide-based nanoparticles. Demonstrates how polysaccharides nanoparticles are being used for a range of biomedical applications, including tissue engineering, drug delivery and biosensors. Assesses the major challenges and risks of using polysaccharides nanoparticles safely and effectively.

**Nanotechnology** - Ram Prasad 2017-09-06

This book explores various nanotechnology applications and their effect on the food industry, innovation and environmental issues. Nanotechnology has had a major impact on the food industry and the environment in recent years - it has increased the nutritional and functional properties of a number of food products, food packaging, food quality, crop protection, plant nutrient management and aided the food industry through the introduction of food diagnostics.

**Marine Algae Extracts, 2 Volume Set** - Se-Kwon Kim  
2015-04-27

Designed as the primary reference for the biotechnological use of macroalgae, this comprehensive handbook covers the entire value chain from the cultivation of algal biomass to harvesting and processing it, to product extraction and formulation. In addition to covering a wide range of product classes, from polysaccharides to terpenes and from enzymes to biofuels, it systematically discusses current and future applications of algae-derived products in pharmacology, medicine, cosmetics, food and agriculture. In doing so, it brings together the expertise of marine researchers, biotechnologists and process engineers for a one-stop resource on the biotechnology of marine macroalgae.

**Deep-sea Sponge Ecosystems: Knowledge-based Approach Towards Sustainable Management and Conservation** - Joana R. Xavier 2023-02-28

**Microbial Polymers** - Anukool Vaishnav 2021-05-03

This book covers all types of microbe based polymers and their application in diverse sectors with special emphasis on agriculture. It collates latest research, methods, opinion, perspectives, and reviews dissecting the microbial origins of

polymers, their production, design, and processing at industrial level, as well as improvements for specific industrial applications. Book also discusses recent advances in biopolymer production and their modification for amplifying the value. In addition, understanding of the microbial physiology and optimal conditions for polymer production are also explained. This compilation of scientific chapters on principles and practices of microbial polymers fosters the knowledge transfer among scientific communities, industries, and microbiologist and serves students, academicians, researchers for a better understanding of the nature of microbial polymers and application procedure for sustainable ecosystem

**Biopolymer Based Micro- and Nano-Materials** - Nitar Nwe 2015-04-27

This concise monograph series focuses on the implementation of various engineering principles in the conception, design, development, analysis and operation of biomedical, biotechnological and nanotechnology systems and applications. Authors are encouraged to submit their work in the following core topics, but authors should contact the commissioning editor before submitting a proposal.

**New Approaches to Natural Anticancer Drugs** - Soodabeh Saeidnia 2015-02-05

This book provides an up-to-date review of recently identified natural anti-tumor compounds from various natural origins including plants, fungi, endophytic fungi and marine organisms. It also includes discussion of new areas such as biotechnology and nanoparticles. Chapters explain the challenges and developments in anti-cancer drug discovery approaches, traditional remedies for prevention and treatment of cancer, marine-derived anti-cancer compounds, and antibiotics used as anti-cancer agents, as well as different classes of terpenoids and carbohydrates, which have been the subject of discussion in this field as efficient anti-cancer candidates. This book will be a concise guide for researchers in the field of pharmaceutical sciences, students and residents in pharmacy and medicine as well as those researching phytochemistry and natural products.

*Marine Biomaterials* - Sougata Jana 2022-02-14

This book is focused on marine based biomedical carriers for delivery of therapeutics. Marine biomaterials and bio-based carriers show wide applications in pharmaceutical as well as biomedical fields for delivery of small and large molecules. Biomaterial-based composites, scaffolds or matrix systems are promising systems for controlled and prolonged release of drug in target site and control the premature release of drugs or bioactive compounds. This book discusses the targeted delivery of drugs and therapeutic applications. It also describes the use of marine biopolymers in cancer therapy. Different chapters describe the tissue engineering techniques to develop these carriers. The marine biomaterial-based systems are widely used for tissue engineering, and biomedical imaging. This book is meant for industry experts, students and researchers in the area of pharmaceutical sciences, biomedical engineering and material science and pharmacology.

**Biological Activities and Application of Marine**

**Polysaccharides** - Emad Shalaby 2017-01-11

Marine organisms have been under research for the last decades as a source for different active compounds with various biological activities and application in agriculture, pharmacy, medicine, environment, and industries. Marine polysaccharides from these active compounds are used as antibacterial, antiviral, antioxidant, anti-inflammation, bioremediations, etc. During the last three decades, several important factors that control the production of phytoplankton polysaccharides have been identified such as chemical concentrations, temperature, light, etc. The current book includes 14 chapters contributed by experts around the world; the chapters are categorized into three sections: Marine Polysaccharides and Agriculture, Marine Polysaccharides and Biological Activities, and Marine Polysaccharides and Industries.

*Antimicrobial Materials for Biomedical Applications* - Abraham J Domb 2019-08-02

With the need to combat emerging infectious diseases, research around antimicrobial biomaterials and their applications is booming. This book provides the field with a much-needed fundamental overview of the science, addressing the chemistry of

a broad range of biomaterial types, and their applications in the biomedical industry. Materials covered include polymers, from those with inherent antimicrobial activity to those that release antimicrobial agents, antimicrobial ceramics and inorganic compounds, such as metal based antimicrobial additives, and the developing field of biomimetic materials, are discussed. Surfaces, coatings and adhesives are covered, whilst the applications of these antimicrobial materials in biomedical applications, from catheters to orthopaedics, dentistry to ophthalmology, are explored. Edited by international leaders and with contributions from the best in the field, this book is the go-to resource for graduates and researchers in biomaterials science, biomedical engineering, chemical engineering, and materials and polymer chemistry.

*Chitosan for Biomaterials IV* - R. Jayakumar 2021-09-30

This volume presents the recent developments on the biomedical applications of chitosan and its derivatives. Chitosan exhibits unique properties such as non-toxicity, biodegradability and biocompatibility. Since its chemical structure and properties can be easily modified, it can be an ideal candidate as a biomaterial. Consequently, chitosan and its derivatives are being developed in different forms such as nanoparticles, micelles, nanofibers, hydrogels, films and 3D porous materials for various biomedical applications, ranging from drug and gene delivery to tissue engineering and regenerative medicine. The chapters of this volume focus on the potential use of chitosan and its derivatives as a hemostatic agent, tissue sealants, tissue engineering scaffolds, delivery carriers for bioactive molecules in bone tissue engineering and wound dressings. Some chapter's deal with recent advancements of chitosan-based biomaterials as a drug, gene and transdermal drug delivery carrier. In addition, the volume focusses on the prospects of chitosan-based systems for the treatment of cancer, eye and other infectious diseases. The volume will be of interest to material scientists, chemists and biotechnologists by providing a better understanding of the physicochemical and biological characteristics of chitosan and its derivatives to develop more appropriate and innovative chitosan-based materials modified for unlimited practical applications in biomedical fields.

*Marine Biomaterials* - Se-Kwon Kim 2017-03-29

Oceans are an abundant source of diverse biomaterials with potential for an array of uses. *Marine Biomaterials: Characterization, Isolation and Applications* brings together the wide range of research in this important area, including the latest developments and applications, from preliminary research to clinical trials. The book is divided into four parts, with chapters written by experts from around the world. Biomaterials described come from a variety of marine sources, such as fish, algae, microorganisms, crustaceans, and mollusks. Part I covers the isolation and characterization of marine biomaterials♦bioceramics, biopolymers, fatty acids, toxins and pigments, nanoparticles, and adhesive materials. It also describes problems that may be encountered in the process as well as possible solutions. Part II looks at biological activities of marine biomaterials, including polysaccharides, biotoxins, and peptides. Chapters examine health benefits of the biomaterials, such as antiviral activity, antidiabetic properties, anticoagulant and anti-allergic effects, and more. Part III discusses biomedical applications of marine biomaterials, including nanocomposites, and describes applications of various materials in tissue engineering and drug delivery. Part IV explores commercialization of marine-derived biomaterials♦marine polysaccharides and marine enzymes♦and examines industry perspectives and applications. This book covers the key aspects of available marine biomaterials for biological and biomedical applications, and presents techniques that can be used for future isolation of novel materials from marine sources.

*Marine Carbohydrates: Fundamentals and Applications* - 2014-07-29

*Marine Carbohydrates: Fundamentals and Applications* brings together the diverse range of research in this important area which leads to clinical and industrialized products. The volume, number 72, focuses on marine carbohydrates in isolation, biological, and biomedical applications and provides the latest trends and developments on marine carbohydrates. Advances in

Food and Nutrition Research recognizes the integral relationship between the food and nutritional sciences and brings together outstanding and comprehensive reviews that highlight this relationship. Volumes provide those in academia and industry with the latest information on emerging research in these constantly evolving sciences. Includes the isolation techniques for the exploration of the marine habitat for novel polysaccharides. Discusses biological applications such as antioxidant, antiallergic, antidiabetic, antiobesity and antiviral activity of marine carbohydrates. Provides an insight into present trends and approaches for marine carbohydrates.

**Chitin and Chitosan** - Gregorio Crini 2022-06-30

Chitin and Chitosan: Discoveries and Applications for Sustainability provides the most comprehensive knowledge on these organic biopolymers which come from the cellular makeup of crustaceans, mollusks and arthropods. This book synthesizes historical information, fundamental properties, industrial applications, and recent discoveries and uses. Written by an international expert on chitin and chitosan sources and uses, the book discusses landmark discoveries and early uses in the research and applications of chitin and chitosan. It then explores the international use of chitin and chitosan as organic solutions across various disciplines such as aquaculture, agriculture, food and beverage industries, cosmetics and medicine. Finally, the book assesses their environmental applications for sustainable solutions, such as wastewater treatments and future chitin and chitosan usage as an organic solution for a more sustainable, green, healthy planet. Offers a comprehensive review of these biopolymers, from their discovery to their use in our daily lives. Details the main historical facts on their composition, structure and properties. Emphasizes the chemical and biological properties and applications of chitosan. Describes key challenges and future trends.

**Sulfated Polysaccharides** - Miguel Gama 2015

In the post-genomic era, science is still challenged to explain the biosynthesis of complex polysaccharides and glycoconjugates. Unlike nucleic acids and proteins, the information needed for their biosynthesis is not clearly contained to this day within the genome of the various organisms. This means that no biosynthetic code has been revealed yet. As a result, there will be millions of structurally distinct, functional chemical species at the end of their biosynthesis. This book offers an up-to-date view on sulfated polysaccharide structure and function state of the art in different life kingdoms: bacteria, protista, plantae, fungi and animalia. The structure, activities and current thinking on the interplay between these two vital features (as well as ways to study them) are reviewed in the present book. The growing economical interest in sulfated polysaccharides due to their potential biotechnological use in different areas, such as pharmaceutical and food industries, are also commented on. The information within the chapters adds to other prior available literature; the intention of the authors was to extend and further develop the discussions related to glycobiology.

**Microbial Surfactants** - R.Z. Sayyed 2021-11-30

Biosurfactants are the surface-active biomolecules produced by microorganisms. Biosurfactants have gained commercial significance due to their unique properties, such as high surface activity, high specificity, low toxicity, tolerance to pH, temperature and ionic strength, biodegradability, excellent emulsifying and demulsifying ability, antimicrobial activity, ability to work under extreme conditions, and relative ease of preparation. Biosurfactants are used in several industries, including organic chemicals, petroleum, petrochemicals, mining, metallurgy (mainly bioleaching), agrochemicals, fertilizers, foods, beverages, cosmetics, pharmaceuticals and many others. The aim of this book is to highlight key aspects from basics to advanced concepts, classifications, production and applications in various fields such as agriculture, health, bioremediation, industries, pharmaceutical, oil recovery, environment, and nanotechnology. It also serves as an excellent and expansive literature on fermentation, recovery, genomics, and metagenomics of biosurfactant production. The book focuses on the biosurfactant production from bacteria, the diversity of biosurfactant producing bacteria, and industrial need of biosurfactant.

**Industrially Important Fungi for Sustainable Development** -

Ahmed M. Abdel-Azeem 2021-12-02

Fungi are an essential, fascinating and biotechnologically useful group of organisms with an incredible biotechnological potential for industrial exploitation. Knowledge of the world's fungal diversity and its use is still incomplete and fragmented. There are many opportunities to accelerate the process of filling knowledge gaps in these areas. The worldwide interest of the current era is to increase the tendency to use natural substances instead of synthetic ones. The increasing urge in society for natural ingredients has compelled biotechnologists to explore novel bioresources which can be exploited in industrial sector. Fungi, due to their unique attributes and broad range of their biological activities hold great promises for their application in biotechnology and industry. Fungi are an efficient source of antioxidants, enzymes, pigments, and many other secondary metabolites. The large scale production of fungal pigments and their utility provides natural coloration without creating harmful effects on entering the environment, a safer alternative use to synthetic colorants. The fungal enzymes can be exploited in wide range of industries such as food, detergent, paper, and also for removal toxic waste. This book will serve as valuable source of information as well as will provide new directions to researchers to conduct novel research in field of mycology. Volume 2 of "Industrially Important Fungi for Sustainable Development" provides an overview to understanding bioprospecting of fungal biomolecules and their industrial application for future sustainability. It encompasses current advanced knowledge of fungal communities and their potential biotechnological applications in industry and allied sectors. The book will be useful to scientists, researchers, and students of microbiology, biotechnology, agriculture, molecular biology, and environmental biology.

**Seaweed Polysaccharides** - Jayachandran Venkatesan 2017-05-30

Seaweed Polysaccharides: Isolation, Biological, and Biomedical Applications examines the isolation and characterization of algal biopolymers, including a range of new biological and biomedical applications. In recent years, significant developments have been made in algae-based polymers (commonly called polysaccharides), and in biomedical applications such as drug delivery, wound dressings, and tissue engineering. Demand for algae-based polymers is increasing and represent a potential—very inexpensive—resource for these applications. The structure and chemical modification of algal polymers are covered, as well as the biological properties of these materials – including antithrombic, anti-inflammatory, anticoagulant, and antiviral aspects. Toxicity of algal biopolymers is also covered. Finally, the book introduces and explains real world applications of algal-based biopolymers in biomedical applications, including tissue engineering, drug delivery, and biosensors. This is the first book to cover the extraction techniques, biomedical applications, and the economic perspective of seaweed polysaccharides. It is an essential text for researchers and industry professionals looking to work with this renewable resource. Provides comprehensive coverage of the research currently taking place in biomedical applications of algae biopolymers. Includes practical guidance on the isolation, extraction, and characterization of polysaccharides from sustainable marine sources. Covers the extraction techniques, biomedical applications, and economic outlook of seaweed polysaccharides.

**Fungal Biotechnology** - Sunil K. Deshmukh 2022-08-18

Traditional studies in mycology mainly deal with damage caused by fungi, for instance, diseases of plants, animal ailments, air-borne pathogens, decomposition of wood and production of mycotoxins in food. Applied mycology focuses on the fermentation of foods (flours, bakery products, cheese and others) and production of fermented products (wine, beer and spirit). Further value-added approaches show the significance of fungi in the production of bioactive metabolites and pharmaceuticals used in the treatment of human diseases, including cancer, and plant diseases (e.g. pest control). Due to a dependence on fossil resources, production of bio-renewable merchandise gained importance and fungi serve as potential biological agents in sustaining global economy. Recent developments in mycology revealed their significance in the fields of advanced research, in

particular building materials, packaging resources, electronic devices and leather-like goods. In addition, fungi possess several qualities to degrade non-biodegradable compounds in the ecosystem and assist in sustainable waste bioremediation. This book covers the current biotechnological advances and bio-prospect potential of fungi. Fungal biopolymers possess various applications, including prebiotics, therapeutics, immunocuticals, drug-discovery and drug-delivery. Fungal bioactive metabolites have several implications beyond antibiotics, such as volatiles, biofuels, nematocides and pigments. They also serve as prospective tools in the production of nanoparticles of medicinal, nutritional and industrial significance. In view of environmental protection, fungal activity and products aid in bioremediation via degradation of xenobiotics and solid wastes. Fungi can produce agriculturally compatible metabolites to enhance plant production. Knowledge on fungal genomics facilitates the gene manipulation towards biotechnological applications (disease diagnosis, pathogen detection, gene expression and mutualistic interactions). This book addresses the application of fungi in different areas and serves as a potential knowledge bank for graduates, post-graduates and researchers contemplating fungal applications.

**Herbal Biomolecules in Healthcare Applications** - Subhash C. Mandal 2021-10-05

Herbal Biomolecules in Healthcare Applications presents extensive detailed information on all the vital principles, basics and fundamental aspects of multiple herbal biomolecules in the healthcare industry. This book examines important herbal biomolecules including alkaloids, glycosides, flavonoids, anthraquinones, steroids, polysaccharides, tannins and polyphenolic compounds, terpenes, fats and waxes, proteins and peptides, and vitamins. These herbal biomacromolecules are responsible for different bioactivities as well as pharmacological potentials. A systematic understanding of the extraction, purification, characterization, applications of these herbal biomolecules and their derivatives in healthcare fields is developed in this comprehensive book. Chapters explore the key topics along with an emphasis on recent research and developments in healthcare fields by leading experts. They include updated literature review of the relevant key topics, good quality illustrations, chemical structures, flow charts, well-organized tables and case studies. Herbal Biomolecules in Healthcare Applications will be useful for researchers working on natural products and biomolecules with bioactivity and nutraceutical properties. Professionals specializing in scientific areas such as biochemistry, pharmacology, analytical chemistry, organic chemistry, clinics, or engineering focused on bioactive natural products will find this book useful. Provides a study of different type of biomolecules from herbal extracts and their bioactivities as well as their application in the healthcare industry Contributions by global leaders and experts from academia, industry and regulatory agencies, who have been considered as pioneers in the application of herbal biomolecules in the diverse healthcare fields Includes updated literature review along with practical examples and research case studies

**Marine Antioxidants** - Se-Kwon Kim 2022-12-15

Marine Antioxidants: Preparations, Syntheses, and Applications provides the most updated and comprehensive knowledge on utilizing marine-derived substances for cosmeceutical, pharmaceutical and nutraceutical developments. The book delivers the isolation procedures and biological activity of marine-derived antioxidant substances as discussed by international experts on antioxidant material from actinobacteria, crustaceans, diatoms, fish, microalgae, microbes, and mangrove-associated marine organisms and seagrasses. In addition, the book details marine-derived bioactive antioxidants substances in the form of proteins, peptides, polysaccharides and lipids. Finally, the book provides the latest information on the mechanistic pathways of antioxidant substances with various diseases and nutritional perspectives. This is an essential resource for marine biotechnologists and marine biologists who want to better understand isolation procedures and antioxidant applications. Researchers interested in pharmaceutical nutrients, polymer science, and cosmeceuticals industries scientists, as well as students and academics, will also benefit from this book. Explores

under-utilized marine products for commercial applications Offers isolated information and biological applications of each identified marine antioxidant Discusses the latest approaches to treatments of diseases, such as diabetes, arthritis, and cancer using marine resources

**Marine Biotechnology in the Twenty-First Century** - National Research Council 2002-05-29

Dramatic developments in understanding the fundamental underpinnings of life have provided exciting opportunities to make marine bioproducts an important part of the U.S. economy. Several marine based pharmaceuticals are under active commercial development, ecosystem health is high on the public's list of concerns, and aquaculture is providing an ever greater proportion of the seafood on our tables. Nevertheless, marine biotechnology has not yet caught the public's, or investor's, attention. Two workshops, held in October 1999 and November 2001 at the National Academies, were successful in highlighting new developments and opportunities in environmental and biomedical applications of marine biotechnology, and also in identifying factors that are impeding commercial exploitation of these products. This report includes a synthesis of the 2001 sessions addressing drug discovery and development, applications of genomics and proteomics to marine biotechnology, biomaterials and bioengineering, and public policy and essays contributed by the workshop speakers.

**Marine Biological Materials of Invertebrate Origin** - Hermann Ehrlich 2019-10-17

The work is a source of modern knowledge on biomineralization, biomimetics and bioinspired materials science with respect to marine invertebrates. The author gives the most coherent analysis of the nature, origin and evolution of biocomposites and biopolymers isolated from and observed in the broad diversity of marine invertebrate organisms and within their unusual structural formations. The basic format is that of a major review article, with liberal use of references to original literature. There is a wealth of new and newly synthesized information, including dozens of previously unpublished images of unique marine creatures and structures from nano- to microscale including high-resolution scanning and transmission electron micrographs. The material is organized effectively along both biological (phyla) and functional lines. The classification of biological materials of marine origin is proposed and discussed. Much of the pertinent data is organized into tables, and extensive use is made of electron micrographs and line drawings. Several modern topics e.g. "biomineralization- demineralization-rem mineralization phenomena", or "phenomenon of multiphase biomineralization", are discussed in details. Traditionally, such current concepts as hierarchical organization of biocomposites and skeletal structures, structural bioscaffolds, biosculpturing, biomimeticism and bioinspiration as tools for the design of innovative materials are critically analyzed from both biological and materials science point of view using numerous unique examples of marine origin. This monograph reviews the most relevant advances in the marine biomaterials research field, pointing out several approaches being introduced and explored by distinct laboratories.

**Marine Proteins and Peptides** - Se-Kwon Kim 2013-03-18

Food proteins and bioactive peptides play a vital role in the growth and development of the body's structural integrity and regulation, as well as having a variety of other functional properties. Land animal-derived food proteins such as collagen and gelatin carry risks of contamination (such as BSE). Marine-derived proteins, which can provide equivalents to collagen and gelatin without the associated risks, are becoming more popular among consumers because of their numerous health beneficial effects. Most marine-derived bioactive peptides are currently underutilized. While fish and shellfish are perhaps the most obvious sources of such proteins and peptides, there is also the potential for further development of proteins and peptides from sources like algae, sea cucumber and molluscs. Marine-derived proteins and peptides also have potential uses in novel products, with the possibility of wide commercialization in the food, beverage, pharmaceutical and cosmetic industries, as well as in other fields such as photography, textiles, leather, electronics, medicine and biotechnology. Marine Proteins and Peptides:

Biological Activities and Applications presents an overview of the current status, future industrial perspectives and commercial trends of bioactive marine-derived proteins and peptides. Many of the industrial perspectives are drawn from the food industry, but the book also refers to the pharmaceutical and cosmetics industries. There have recently been significant advances in isolating functional ingredients from marine bio-resources and seafood by-products for use in these industries, but little has been published, creating a knowledge gap, particularly with regard to the isolation and purification processes. This book is the first to fill that gap. *Marine Proteins and Peptides: Biological Activities and Applications* is a valuable resource for researchers in the marine biochemistry field as well as food industry managers interested in exploring novel techniques and knowledge on alternative food protein sources. It will become a standard reference book for researchers involved in developing marine bio-resources and seafood by-products for novel nutraceutical, cosmetics, and pharmaceutical applications. It will also appeal to managers and product developers in the food, pharmaceutical and cosmetics industries, particularly those looking to use marine-derived proteins and peptides as substitutes or replacements for unfashionable or outdated food components.

**Encyclopedia of Marine Biotechnology** - Se-Kwon Kim  
2020-08-14

A keystone reference that presents both up-to-date research and the far-reaching applications of marine biotechnology. Featuring contributions from 100 international experts in the field, this five-volume encyclopedia provides comprehensive coverage of topics in marine biotechnology. It starts with the history of the field and delivers a complete overview of marine biotechnology. It then offers information on marine organisms, bioprocess techniques, marine natural products, biomaterials, bioenergy, and algal biotechnology. The encyclopedia also covers marine food and biotechnology applications in areas such as pharmaceuticals, cosmeceuticals, and nutraceuticals. Each topic in *Encyclopedia of Marine Biotechnology* is followed by 10-30 subtopics. The reference looks at algae cosmetics, drugs, and fertilizers; biodiversity; chitins and chitosans; aeropylsinin-1, toluquinol, astaxanthin, and fucoxanthin; and algal and fish genomics. It examines neuro-protective compounds from marine microorganisms; potential uses and medical management of neurotoxic phycotoxins; and the role of metagenomics in exploring marine microbiomes. Other sections fully explore marine microbiology, pharmaceutical development, seafood science, and the new biotechnology tools that are being used in the field today. One of the first encyclopedic books to cater to experts in marine biotechnology. Brings together a diverse range of research on marine biotechnology to bridge the gap between scientific research and the industrial arena. Offers clear explanations accompanied by color illustrations of the techniques and applications discussed. Contains studies of the applications of marine biotechnology in the field of biomedical sciences. Edited by an experienced author with contributions from internationally recognized experts from around the globe. *Encyclopedia of Marine Biotechnology* is a must-have resource for researchers, scientists, and marine biologists in the industry, as well as for students at the postgraduate and graduate level. It will also benefit companies focusing on marine biotechnology, pharmaceutical and biotechnology, and bioenergy.

**Marine Biomaterials** - Se-Kwon Kim 2013-04-11

Oceans are an abundant source of diverse biomaterials with potential for an array of uses. *Marine Biomaterials: Characterization, Isolation and Applications* brings together the wide range of research in this important area, including the latest developments and applications, from preliminary research to clinical trials. The book is divided into four parts, with chapters written by experts from around the world. Biomaterials described come from a variety of marine sources, such as fish, algae, microorganisms, crustaceans, and mollusks. Part I covers the isolation and characterization of marine biomaterials—bioceramics, biopolymers, fatty acids, toxins and pigments, nanoparticles, and adhesive materials. It also describes problems that may be encountered in the process as well as possible solutions. Part II looks at biological activities of marine biomaterials, including polysaccharides, biotoxins, and peptides.

Chapters examine health benefits of the biomaterials, such as antiviral activity, antidiabetic properties, anticoagulant and anti-allergic effects, and more. Part III discusses biomedical applications of marine biomaterials, including nanocomposites, and describes applications of various materials in tissue engineering and drug delivery. Part IV explores commercialization of marine-derived biomaterials—marine polysaccharides and marine enzymes—and examines industry perspectives and applications. This book covers the key aspects of available marine biomaterials for biological and biomedical applications, and presents techniques that can be used for future isolation of novel materials from marine sources.

**Sustainable Agriculture Reviews 35** - Grégorio Crini  
2019-06-04

This book reviews recent research and applications of chitin and chitosan, as natural alternatives of fossil fuel products, in green chemistry, energy, biotechnology, bioprinting, medicine, water treatment, agriculture and food science. Chitin and chitosan products are polysaccharides derived from food waste of crustaceans and fungi, and thus are cheap, abundant, sustainable, non-toxic, recyclable and biocompatible.

**Biomimetic Polymers** - C.G. Gebelein 2012-12-06

The term biomimetic is comparatively new on the chemical scene, but the concept has been utilized by chemists for many years. Furthermore, the basic idea of making a synthetic material that can imitate the functions of natural materials probably could be traced back into antiquity. From the dawn of creation, people have probably attempted to duplicate or modify the activities of the natural world. (One can even find allusions to these attempts in the Bible; e. g. , Genesis 30. ) The term "mimetic" means to imitate or mimic. The word "mimic" means to copy closely, or to imitate accurately. Biomimetic, which has not yet entered most dictionaries, means to imitate or mimic some specific biological function. Usually, the objective of biomimetics is to form some useful material without the need of utilizing living systems. In a similar manner, the term biomimetic polymers means creating synthetic polymers which imitate the activity of natural bioactive polymers. This is a major advance in polymer chemistry because the natural bioactive polymers are the basis of life itself. Thus, biomimetic polymers imitate the life process in many ways. This present volume delineates some of the recent progress being made in this vast field of biomimetic polymers. Chemists have been making biomimetic polymers for more than fifty years, although this term wasn't used in the early investigations.

**Marine Enzymes Biotechnology: Production and Industrial Applications, Part III - Application of Marine Enzymes** -  
2017-02-17

*Marine Enzymes Biotechnology: Production and Industrial Applications, Part III, Application of Marine Enzymes* provides a huge treasure trove of information on marine organisms and how they are not only good candidates for enzyme production, but also a rich source of biological molecules that are of potential interest to various industries. Marine enzymes such as amylases, carboxymethylcellulases, proteases, chitinases, keratinases, xylanases, agarases, lipases, peroxidase, and tyrosinases are widely used in the industry for the manufacture of pharmaceuticals, foods, beverages, and confectioneries, as well as in textile and leather processing and waste water treatment. The majority of the enzymes used in the industry are of microbial origin because microbial enzymes are relatively more stable than the corresponding enzymes derived from plants and animals. Focuses on the isolation, characterization, and industrial application of marine enzymes. Provides current trends in industrial important marine enzymes, including amylases, carboxymethylcellulases, proteases, chitinases, keratinases, xylanases, agarases, lipases, peroxidase, and tyrosinases. Presents insights into current trends and approaches for marine enzymes. *Sustainable Agriculture Reviews 36* - Grégorio Crini 2019-06-04  
This book reviews recent research and applications of chitin and chitosan, as natural alternatives of fossil fuel products, in medicine and pharmacy, agriculture, food science and water treatment. Chitin and chitosan products are polysaccharides derived from food waste of crustaceans and fungi, and thus are cheap, abundant, sustainable, non-toxic, recyclable and biocompatible. Remarkable applications include food additives

and preservation, packaging materials, biopesticides and fertilisers, drug delivery, tissue engineering, bioflocculation and dye removal.

**Marine-Derived Biomaterials for Tissue Engineering**

**Applications** - Andy H. Choi 2019-07-08

This book presents the latest advances in marine structures and related biomaterials for applications in both soft- and hard-tissue engineering, as well as controlled drug delivery. It explores marine structures consisting of materials with a wide variety of characteristics that warrant their use as biomaterials. It also underlines the importance of exploiting natural marine resources for the sustainable development of novel biomaterials and discusses the resulting environmental and economic benefits. The book is divided into three major sections: the first covers the clinical application of marine biomaterials for drug delivery in tissue engineering, while the other two examine the clinical significance of marine structures in soft- and hard-tissue engineering, respectively. Focusing on clinically oriented applications, it is a valuable resource for dentists, oral and maxillofacial surgeons, orthopedic surgeons, and students and researchers in the field of tissue engineering.

*Marine Biotechnology, Revealing an Ocean of Opportunities* - Ana Rotter 2022-03-18

**Marine Biomaterials** - Se-Kwon Kim 2013-04-11

Oceans are an abundant source of diverse biomaterials with

potential for an array of uses. **Marine Biomaterials:**

**Characterization, Isolation and Applications** brings together the wide range of research in this important area, including the latest developments and applications, from preliminary research to clinical trials. The book is divided into four parts, with chapters written by experts from around the world. Biomaterials described come from a variety of marine sources, such as fish, algae, microorganisms, crustaceans, and mollusks. Part I covers the isolation and characterization of marine biomaterials—bioceramics, biopolymers, fatty acids, toxins and pigments, nanoparticles, and adhesive materials. It also describes problems that may be encountered in the process as well as possible solutions. Part II looks at biological activities of marine biomaterials, including polysaccharides, biotoxins, and peptides. Chapters examine health benefits of the biomaterials, such as antiviral activity, antidiabetic properties, anticoagulant and anti-allergic effects, and more. Part III discusses biomedical applications of marine biomaterials, including nanocomposites, and describes applications of various materials in tissue engineering and drug delivery. Part IV explores commercialization of marine-derived biomaterials—marine polysaccharides and marine enzymes—and examines industry perspectives and applications. This book covers the key aspects of available marine biomaterials for biological and biomedical applications, and presents techniques that can be used for future isolation of novel materials from marine sources.