

Bioactive Compounds From Natural Sources Second Edition Natural Products As Lead Compounds In Drug Discovery

Bioactive Compounds - Biosynthesis, Characterization, and Applications is an authoritative compilation of chapters on bioactive compounds with proven activities. It provides valuable information about biosynthesized active compounds that can be used for the further development of products in various industries. Chapters cover such topics as biosynthesis, characterization, separation, and purification, and applications of bioactive molecules. It describes and discusses bioresources of animal, vegetal, and microbial origin as potential sources of flavonoids, polysaccharides, sterols, polyphenols, amino acids, and others. This book provides insight into future developments in the field and, as such, is an essential resource for academicians, industrial researchers, and practitioners in biomolecules with biological activity. Key features: 'ç Describes several classes of bioactive compounds and their associated activities 'ç Highlights potential contributions of bioactive compounds as alternatives in the prevention and/or treatment of diseases 'ç Contains information relevant to the development and use of new products.

Many thousands of years ago, humans were introduced to the toxicants of minerals and plants of microbial origin, and since that time, natural bioactive compounds have been used in traditional medicine for treating different health conditions, but also as aphrodisiacs and as a means of suicide or murder. Modern medicine acknowledges natural bioactive compounds as valuable medicinal sources for both diagnostic and curative purposes. Natural compounds serve as templates for the production of new drugs with improved pharmacological properties. This book explains the term bioactivity and deals with the bioactive compounds of plants, animals, microbial and marine origin. Their use by traditional medicinal approach, as well as by modern medicine is further elaborated. Both beneficial and toxic properties of different chemical classes, including alkaloids, peptides, terpenoids, bioactive amines etc., are described. Their isolation at the industrial scale is presented through several technological processes which are explained in detail for several compound classes. The research explains how natural sources can be exploited my modern and traditional medicine, and presents the risks and benefits associated with their use. In addition, a new approach to studying bioactivity, that includes computational modeling and softwares for in silico description and prediction, is explained. A chemometric approach to studying bioactivity is demonstrated through several models given for some natural bioactive compounds and their derivatives.

Bioactive compounds produced by natural sources, such as plants, microbes, endophytic fungi, etc., can potentially be applied in various fields, including agriculture, biotechnology and biomedicine. Several bioactive compounds have proved to be invaluable in mediating plant-microbe interactions, and promoting plant growth and development. Due to their numerous health-promoting properties, these compounds have been widely used as a source of medication since ancient times. However, there is an unprecedented need to meet the growing demand for natural bioactive compounds in the flavor and fragrance, food, and pharmaceutical industries. Moreover, discovering new lead molecules from natural sources is essential to overcoming the rising number of new diseases. In this regard, natural bioactive compounds hold tremendous potential for new drug discovery. Therefore, this field of research has become a vital area for researchers interested in understanding the chemistry, biosynthetic mechanisms, and pharmacological activities of these bioactive metabolites. This book describes the basics of bioactive plant compounds, their chemical properties, and their pharmacological biotechnological properties with regard to various human diseases and applications in the drug, cosmetics and herbal industries. It offers a valuable asset for all students, educators, researchers, and healthcare experts involved in agronomy, ecology, crop science, molecular biology, stress physiology, and natural products.

This volume presents a survey of the development of bioactive compounds from natural sources. Major areas covered include terrestrial and marine sources for active constituents and lead structures; natural products as experimental tools and leads in drug design; antimicrobial and antitumor compounds; and natural products in drug development.

Nature has always been, and still is, a source of food and ingredients that are beneficial to human health. Nowadays, plant extracts are increasingly becoming important additives in the food industry due to their antimicrobial and antioxidant activities that delay the development of off-flavors and improve the shelf life and color stability of food products. Due to their natural origin, they are excellent candidates to replace synthetic compounds, which are generally considered to have toxicological and carcinogenic effects. The efficient extraction of these compounds from their natural sources and the determination of their activity in commercialized products have been great challenges for researchers and food chain contributors to develop products with positive effects on human health. The objective of this Special Issue is to highlight the existing evidence regarding the various potential benefits of the consumption of plant extracts and plant-extract-based products, with emphasis on in vivo works and epidemiological studies, the application of plant extracts to improving shelf life, the nutritional and health-related properties of foods, and the extraction techniques that can be used to obtain bioactive compounds from plant extracts.

Applications in Natural Product Isolation

Research & Development, Challenges and Perspectives

Studies in Natural Products Chemistry

Theory and Practice

Therapeutic Implications of Natural Bioactive Compounds

Proceedings of the Alfred Benzon Symposium 20 Held at the Premises of the Royal Danish Academy of Sciences and Letters, Copenhagen, 7-11 August 1983

Focusing on the importance of functional foods and their secondary metabolites for human health, this volume presents new insights with scientific evidence on the use of functional foods in the treatment of certain diseases. The plants covered and their bioactive compounds are easily accessible and are believed to be effective with fewer side effects in comparison with modern drugs in the treatment of different diseases. The plants contain chemical compounds that can modify and modulate biological systems, eliciting therapeutic effects. Some plants and derived products mentioned include black carrot, olive oil, citrus peel, grapes, candy leaf, cereals and grains, and green and black tea. The volume is divided into four sections that cover these topics: Functional foods for human health: the available sources, biochemistry, structural composition, and different biological activities, especially antioxidant activity. Pharmacological aspects of fruits and vegetables: the extraction of bioactive molecules, phytochemistry, and biological activities of a selection of plants. Pharmacological aspects of natural products: bioactive compounds, structural attributes, bioactivity of anthocyanin, piceatannol, and a review of the ethnobotany and medicinal properties of green and black tea. Pharmacological aspects of cereals and grains: the health benefits of flaxseed, wheatgrass juice, and use and therapeutic potential as supplements for disease management.

Biomolecules from Natural Sources An up-to-date exploration of new and novel biomolecules In Biomolecules from Natural Sources: Advances and Applications, a team of accomplished researchers delivers up-to-date information on various bioresources, bioprocessing, production, mechanisms of action for selective bioactivity, biochemistry, targeted therapeutic roles and the advancements made on their bioactive potentials of new and novel biomolecules. The book presents recent trends in new and novel biomolecules and their identification, characterization, and potential applications. The selected contributions canvas a variety of breakthroughs in the understanding and applications of naturally derived biomolecules. Biomolecules from Natural Sources: Advances and Applications is an exhaustive collection of research and information, as well as an insightful and interdisciplinary treatment of a rapidly developing field. Readers will also find: A thorough introduction to phenolics from natural sources and plant-based natural artemisinin and its biomedical applications Comprehensive explorations of protein structure, function, and specificity and the pharmacological potential of pigments Practical discussions of biomolecules obtained through food biotechnology and the biological activities of natural glycosides In-depth examinations of biomolecules from basil and their pharmacological significance Perfect for biotechnologists, food technologists, and plant biologists, Biomolecules from Natural Sources: Advances and Applications will also earn a place in the libraries of bioprocessing engineers, as well as undergraduate and postgraduate students of biochemistry.

Natural products from different sources such as plants have played an important role in the prevention of infectious diseases and are of general use in health care. Bioactive compounds that are extracted from natural products are generally regarded as effective and safe compared to synthetic compounds. Synthetic substances such as antibiotics produced by the pharmaceutical industry have in many cases caused side effects such as nausea, vomiting, epigastric pain, abdominal discomfort, diarrhea and have caused the emergence of resistance by pathogenic bacteria, to such an extent that an increasing number of researchers are seeking to produce biologically active compounds from natural sources. One important source of natural products are medicinal plants which have been used as traditional medicine in different parts of the world for many applications such as the treatment of infectious diseases, diarrhea, hypertension, skin diseases and other conditions.

Interest in obtaining biologically active compounds from natural sources has recently spiked due to their low toxicity, complete biodegradability, availability from renewable sources, and in most cases, low cost. Taking an interdisciplinary approach, Bioactive Compounds from Natural Sources: Isolation, Characterization, and Biological Properties covers general methods and main topics in the research field of bioactive natural products. The book describes general screening methods, modern HPLC hyphenated techniques, and NMR methods in the structural elucidation of compounds and devotes individual chapters to specific topics of research. Surveys on compounds displaying important pharmacological activities are presented in chapters devoted to Mexican medicinal plants, anti-tumor drugs of natural origin, cancer chemopreventive flavonoids, and metabolites displaying anti-HIV, antioxidative, antimalarial, and anti-inflammatory activity. The final chapters are devoted to representative examples of research into marine metabolites: immunomodulating marine glycolipids and surveys of bioactive compounds from marine opisthobranchs and Japanese soft corals. With its focus on modern approaches to the isolation of biologically active natural products, this book encourages interdisciplinary work among chemists, pharmacologists, biologists, botanists, and agronomists with an interest in bioactive natural products.

Bioactive natural products are proving to be a rich source of novel therapeutics to both protect against and combat diseases, as well as serve as lead compounds in crop protection. Following the successful format of the first edition, this volume brings together collective research from many new contributors and emphasizes the rationale behind the

Preparative Chromatography Techniques

Water Extraction of Bioactive Compounds

Plant Extracts: Applications in the Food Industry

Synthesis of Medicinal Agents from Plants

Natural Product Extraction

Bioactive Natural Products for Pharmaceutical Applications

Plants have been widely used to treat diseases, owing to the presence of bioactive compounds (phytochemicals) which play important roles in health promotion and disease prevention. In recent years, advances in chemical extraction techniques, lifestyle and dietary choices for human health have increased the interest in the consumption and study of fruits, vegetables, and foods enriched with bioactive compounds and nutraceuticals. Thousands of dietary phytochemicals, such as flavonoids, phenolic acids, glucosinolates, terpenes and alkaloids, have been identified and categorized further according to a diverse array of biochemical properties. Many of these phytochemicals have been hypothesized to reduce the risk of several pathological conditions which include life threatening diseases such as heart disease and cancer, to name a few. Natural Bioactive Compounds from Fruits and Vegetables as Health Promoters is a 2 book set which presents a summary of different classes of phytochemicals commonly found in common edible food sources. Each chapter details the general chemical structures of compounds, naturally present in specific fruits, vegetables and grains, their biological importance and mechanisms of action. The book set is an essential handbook for anyone interested in the natural product chemistry of these common crops. Part I of this set covers details about different fruits (banana, citrus fruits, pears, etc.). Part 2 covers legumes, nuts, seeds and cereals.

This book covers the recent innovations relating to various bioactive natural products (such as alkaloids, glycosides, flavonoids, anthraquinones, steroids, polysaccharides, tannins and polyphenolic compounds, volatile oils, fixed oils, fats and waxes, proteins and peptides, vitamins, marine products, camptothecin, piperines, carvacrol, gedunin, GABA, ginsenosides) and their applications in the pharmaceutical fields related to academic, research and industry.

Plant Extracts in Food Applications is the first book of its kind focusing on the application of plant extracts in the food industry. Topics cover sources, extraction and encapsulation techniques, the chemistry and stability of plant extracts, antimicrobials, preservatives, nutrient enhancers, enzymes, flavoring and coloring agents, packaging aid, health benefits, opportunities and the challenges surrounding the use of plant extracts in food applications. Written by several experts in the field, this book is a valuable resource for students, scientists, and professionals in food science, food chemistry and nutrition. Concerns and potential risks regarding the use of synthetic chemicals have renewed the interests of consumers using natural and safe alternatives. Plant extracts represent an interesting ingredient, mainly due to their natural origin and phytochemical properties, allowing for obtaining active materials to extend shelf-life and add value to the product. Presents chapters that deal with different sources of plant extracts and their applications in the food industry Covers the various extraction procedures which are used for plant extracts Includes the health benefits and stability of plant extracts Provides the role of plant extracts for shelf life enhancement, packaging aid, and as flavoring and coloring agents

Bioactive compounds play a central role in high-value product development in the chemical industry. Bioactive compounds have been identified from diverse sources and their therapeutic benefits, nutritional value and protective effects in human and animal healthcare have underpinned their application as pharmaceuticals and functional food ingredients. The orderly study of biologically active products and the exploration of potential biological activities of these secondary metabolites, including their clinical applications, standardization, quality control, mode of action and potential biomolecular interactions, has emerged as one of the most exciting developments in modern natural medicine. Biotechnology of Bioactive Compounds describes the current stage of knowledge on the production of bioactive compounds from microbial, algal and vegetable sources. In addition, the molecular approach for screening bioactive compounds is also discussed, as well as examples of applications of these compounds on human health. The first half of the book comprises information on diverse sources of bioactive compounds, ranging from microorganisms and algae to plants and dietary foods. The second half of the book reviews synthetic approaches, as well as selected bioactivities and biotechnological and biomedical potential. The bioactive compounds profiled include compounds such as C-phycoyanins, glycosides, phyosterols and natural steroids. An overview of the usage of bioactive compounds as antioxidants and anti-inflammatory agents, anti-allergic compounds and in stem cell research is also presented, along with an overview of the medicinal applications of plant-derived compounds. Biotechnology of Bioactive Compounds will be an informative text for undergraduate and graduate students of bio-medicinal chemistry who are keen to explore the potential of bioactive natural products. It also provides useful information for scientists working in various research fields where natural products have a primary role.

This book highlights different natural products that are derived from the plants and microbes that have shown potential as the lead compounds against infectious diseases and cancer. Natural products represent an untapped source of strikingly diverse chemotypes with novel mechanisms of action and the potential to serve as anticancer and anti-infective agents. The book discusses a range of biotechnologically valuable bioactive compounds and secondary metabolites that have been derived from plant and microorganisms from various ecological niches. It also reviews the latest developments in the field of genomics, bioinformatics and industrial fermentation for harnessing the microbial products for commercial applications. In turn, the book's closing section reviews important biotechnological applications of various natural products. Combining the expertise of specialists in this field, the book's goal is to promote the further investigation of natural sources for the development of standardized, safe and effective therapies.

Biomolecules from Natural Sources

Natural Products as Lead Compounds in Drug Discovery

Natural Sources, Physicochemical Characterization and Applications

Detection, Isolation, and Structural Determination, Second Edition

Technological Advancements

Advances and Applications

Evolutionary Diversity as a Source for Anticancer Molecules discusses evolutionary diversity as source for anticancer agents derived from bacteria, algae, bryophytes, pteridophytes, and gymnosperms. The book goes over the isolation of anticancer agents and the technologyenabled screening process used to develop anticancer drugs. The book also includes discussion of the nutraceuticals and natural products derived from invertebrates that can be used as part of cancer treatment. Evolutionary Diversity as a Source for Anticancer Molecules also deals with some of the current challenges in the prevention of cancer as well as the side effects of conventional drugs used for cancer patients. This book is a valuable resource for cancer researchers, oncologists, biotechnologists, pharmacologists, and any member of the biomedical field interested in understanding more about natural products with anticancer potential. Discusses the application of natural products in place of conventional drugs to minimize the side effects in cancer treatment Explains the relation between evolutionary mechanisms and climate change for production of secondary metabolites Natural products play an integral and ongoing role in promoting numerous aspects of scientific advancement, and many aspects of basic research programs are intimately related to natural products. With articles written by leading authorities in their respective fields of research, Studies in Natural Products Chemistry, Volume 37 presents current frontiers and future guidelines for research based on important discoveries made in the field of bioactive natural products. It is a valuable source for researchers and engineers working in natural products and medicinal chemistry. Describes the chemistry of bioactive natural products Contains contributions by leading authorities in the field A valuable source for researchers and engineers working in natural product and medicinal chemistry

With increasing energy prices and the drive to reduce CO2 emissions, food industries are challenged to find new technologies in order to reduce energy consumption, to meet legal requirements on emissions, product/process safety and control, and for cost reduction and increased quality as well as functionality. Extraction is one of the promising innovation themes that could contribute to sustainable growth in the chemical and food industries. For example, existing extraction technologies have considerable technological and scientific bottlenecks to overcome, such as often requiring up to 50% of investments in a new plant and more than 70% of total process energy used in food, fine chemicals and pharmaceutical industries. These shortcomings have led to the consideration of the use of new "green" techniques in extraction, which typically use less solvent and energy, such as microwave extraction. Extraction under extreme or non-classical conditions is currently a dynamically developing area in applied research and industry. Using microwaves, extraction and distillation can now be completed in minutes instead of hours with high reproducibility, reducing the consumption of solvent, simplifying manipulation and work-up, giving higher purity of the final product, eliminating post-treatment of waste water and consuming only a fraction of the energy normally needed for a conventional extraction method. Several classes of compounds such as essential oils, aromas, anti-oxidants, pigments, colours, fats and oils, carbohydrates, and other bioactive compounds have been extracted efficiently from a variety of matrices (mainly animal tissues, food, and plant materials). The advantages of using microwave energy, which is a non-contact heat source, includes more effective heating, faster energy transfer, reduced thermal gradients, selective heating, reduced equipment size, faster response to process heating control, faster start-up, increased production, and elimination of process steps. This book will present a complete picture of the current knowledge on microwave-assisted extraction (MAE) of bioactive compounds from food and natural products. It will provide the necessary theoretical background and details about extraction by microwaves, including information on the technique, the mechanism, protocols, industrial applications, safety precautions, and environmental impacts.

Natural products play crucial roles in modern drug development, and constitute a prolific source of novel lead compounds or pharmacophores for ongoing drug discovery programs. Chemistry and Pharmacology of Naturally Occurring Bioactive Compounds presents cutting-edge research in the chemistry of bioactive natural products and demonstrates how natural product research continues to make significant contributions in the discovery and development of new medicinal entities. In 21 chapters, this book highlights chemistry and pharmaceutical potential of natural products in modern drug discovery processes, and covers the synthesis and semi-synthesis of potentially bioactive natural products. Written for phytochemists, synthetic chemists, combinatorial chemists, as well as other practitioners and students in related fields, the book features chemical advances in naturally occurring organic compounds and describes their chemical transformations and structure-activity relationships.

Natural products hold a prominent position in the current discovery and development of drugs and have diverse indications for both human and animal health. Plants, in particular, play a leading role as a source of specialized metabolites with medical effects. Other organisms, such as marine and terrestrial animals and microorganisms, produce very important drug candidate molecules. Specialized metabolites from these varied natural sources can be used directly as bioactive compounds or drug precursors. In addition, due to their broad chemical diversity, they can act as drug prototypes and/or be used as pharmacological tools for different targets. Some examples of natural metabolites that have been developed into useful medical drug are cardiotonic digoxin from Digitalis sp., antimalarial artemisinin from Artemisia annua, anti-cancer taxol from Taxus sp., or podophyllotoxin from Podophyllum peltatum, which served as a synthetic model for the anti-cancer etoposide. The study of natural products is still attracting great scientific attention and their current importance, as a valuable lead for drug discovery, is undebatable. I cordially invite

*authors to contribute original articles, as well as survey articles, that give the readers of Molecules **MOLECULES NEEDS TO BE ITALICIZED** updated and new perspectives on natural products in drug discovery, including but not limited to natural sources, identification and separation of bioactive phytochemicals, standardization, new biological targets, pre-clinical and clinical trials, pharmacological effects/side effects, and bioassays.*

Potentials and Prospects

Bioactive Compounds from Natural Sources

From Plants to Drug Development

Phytochemicals as Lead Compounds for New Drug Discovery

Principles and Applications

Natural Products in Clinical Trials

This book addresses the highly relevant and complex subject of research on drugs from natural products, discussing the current hot topics in the field. It also provides a detailed overview of the strategies used to research and develop these drugs. Respected experts explore issues involved in the production chain and when looking for new medicinal agents, including aspects such as therapeutic potential, functional foods, ethnopharmacology, metabolomics, virtual screening and regulatory scenarios. Further, the book describes strategic methods of isolation and characterization of active principles, biological assays, biotechnology of plants, synthesis, clinical trials and the use of tools to identify active principles.

Over the past few years, increasing attention has been paid to the search for bioactive compounds from natural sources. The success of plant-derived products such as paclitaxel (Taxol) in tumor therapy or artemisinin in the treatment of malaria has provided the impetus for the introduction of numerous research programmes, especially in Industry. A great deal of effort is being expended in the generation of novel lead molecules of vegetable, marine and microbial origin by the use of high throughput screening protocols. When interesting hits are found, it is essen tial to have methods available for the rapid isolation of target compounds. For this reason, both industry and academia need efficient preparative chromatographic separation techniques and experience in their application. Purified natural products are required for complete spectro scopic identification and full characterization of new compo unds, for biological testing and for the supply of pharmaceuti cals, standards, and starting materials for synthetic work. Obtaining pure products from an extract can be a very long, te dious and expensive undertaking, involving many steps. Sometimes only minute amounts of the desired compounds are at hand and these entities may be labile. Thus it is an advantage to have access to as many different methods as possible in order to aid the isolation process. Although a certain amount of trial and error may be involved, nowadays there is the possibility of devising suitable rapid separation schemes by a judicious choice of the different techniques available.

This book focuses on the modern approach to the isolation of biologically active natural products and provides numerous examples of the isolation and characterization of secondary metabolites. It emphasizes the synthetic or semi-synthetic analogues of natural products, relevant to those working on biomedical applications of natural products. It Natural products continue to play a key role in drug development. A recent analysis of the drug market in the developed world revealed that 40% of total clinically approved drugs were either unmodified natural products or their semi-synthetic derivatives. This book series focuses on reviews of exciting new bioactive natural products that have huge potential as drugs. It highlights the everlasting importance of natural products in our lives. Each volume brings reviews contributed by eminent scientists in the field. The first volume covers the following topics: - bioactive compounds from marine invertebrates - natural product derived drugs for immunological and inflammatory diseases - clinical trials of curcumin, camptothecin, astaxanthin, and biochanin - antibacterial and antifungal drugs from natural sources - natural products as anti-HIV medicines.

Bioactive natural products are a rich source of novel therapeutics. Thus, the search for bioactive molecules from nature continues to play an important role in fashioning new medicinal agents. This volume, which comprises sixteen chapters written by active researchers and leading experts in natural products chemistry, brings together an overview of current discoveries in this remarkable field. It also provides information on the industrial application of natural products for medicinal purposes. This book will serve as a valuable resource for researchers to predict promising leads for developing pharmaceuticals to treat various ailments and disease manifestations.

Natural Bio-active Compounds

Natural Products and Drug Discovery

Recent Advances in Natural Products Analysis

Isolation, Characterization and Biological Properties

Bioactive Compounds from Natural Sources, Second Edition

Natural products have played an important role throughout the world in treating and preventing human diseases. Natural product medicines have come from various materials including terrestrial plants, terrestrial microorganisms, organisms etc. Historical experiences with plants as therapeutic tools have helped to introduce single chemical entries in modern medicine.

About 40% of the drugs used are derived from natural sources. Most are pure substances which are isolated from various organisms & used directly or after chemical modification. Natural products will continue to be important in three areas of drug discovery: as targets for production by biotechnology as a source of new lead compounds of novel chemical structure and as the active ingredients of useful treatments derived from traditional systems. Biotechnology will contribute more new natural products for medicinal use. Plants provide a fertile source of natural products many of which are clinically important medicinal agents. Natural products have traditionally provided most of the drugs in use. Despite the achievements of synthetic chemistry and the advances towards rational drug design, natural products continue to be essential in providing medicinal compounds and as starting points for the development of synthetic analogues. With the increasing power of screening programs and the increasing interest in the reservoir of untested natural products, many future drug developments will be based, at least in part, on natural products. The major contents of the book are plant products produced in cell culture , application of genetic engineering to the production of pharmaceuticals , anti transpirants and plant growth regulators based , the potential and the problems of marine natural products, marine sterols, plants as a source of anti-inflammatory substances, anti hepatotoxic principles in oriental medicinal plants, immune stimulants of fungi and higher plants, amanita muscaria in medicinal chemistry, ergot alkaloids and their derivatives in medicinal chemistry and therapy, development of drugs from cannabinoids, etc. This book contains development of new drugs from plants, work on some Thai medicinal plants, plant growth based on Jasmonates, marine sterols, bleomycin and its derivatives, drugs from cannabinoids, bioactive compounds from nature, fungi and higher plants, biological active compounds from British Marine, microbial phytotoxins as herbicides and many more. This book will be very helpful to its readers, upcoming entrepreneurs, scientists, existing industries, technical institutions, druggist etc.

Food Quality and Shelf Life covers all aspects and challenges of food preservation, packaging and shelf-life. It provides information on the most important pillars in the field, starting with active and smart packaging materials, novel technologies, and control tools in all stages between production and consumer. The book gives emphasis to methodological approaches for sensory shelf-life estimation and the impact of packaging on sensorial properties. Researchers and professionals alike will find this reference useful, especially those who are interested in the performance evaluation of future packaging for fresh produce in the cold chain and temperature management in the supply chain. Presents insights regarding new trends in emerging technologies in the field Includes hot topics, such as modified atmosphere packaging and active materials to improve shelf-life Provides shelf-life assessment and modeling methodologies and accelerated shelf-life testing

Natural products continue to serve as sources for the development of new medicines. There is currently a revival of interest in the discovery of bioactive compounds with new chemical structures from natural sources, largely due to the fact that synthetic libraries have not yielded the expected number of developmental candidates in the pharmaceutical industry during the last decade. In addition, the emergence of clinically relevant pathogens that are becoming increasingly resistant to currently used medicines strengthens the notion that natural product research is urgently required. Considering the fact that almost 10% of bioactive compounds are of microbial origin, and that marine microorganisms are relatively poorly studied compared to their terrestrial relatives, marine microorganisms are regarded as the most potential-laden resource for drug discovery.

Natural products are sought after by the food, pharmaceutical and cosmetics industries, and research continues into their potential for new applications. Extraction of natural products in an economic and environmentally-friendly way is of high importance to all industries involved. This book presents a holistic and in-depth view of the techniques available for extracting natural products, with modern and more environmentally-benign methods, such as ultrasound and supercritical fluids discussed alongside conventional methods. Examples and case studies are presented, along with the decision-making process needed to determine the most appropriate method. Where appropriate, scale-up and process integration is discussed.

Relevant to researchers in academia and industry, and students aiming for either career path, Natural Product Extraction presents a handy digest of the current trends and latest developments in the field with concepts of Green Chemistry in mind.

Recent Advances in Natural Products Analysis is a thorough guide to the latest analytical methods used for identifying and studying bioactive phytochemicals and other natural products. Chemical compounds, such as flavonoids, alkaloids, carotenoids and saponins are examined, highlighting the many techniques for studying their properties. Each chapter is devoted to a compound category, beginning with the underlying chemical properties of the main components followed by techniques of extraction, purification and fractionation, and then techniques of identification and quantification. Biological activities, possible interactions, levels found in plants, the effects of processing, and current and potential industrial applications are also included. Focuses on the latest analytical techniques used for studying phytochemical and other biological compounds Authored and edited by the top worldwide experts in their field Discusses the current and potential applications and predicts future trends of each compound group

Opportunities and Challenges in Medicinal Chemistry

Natural Products from Marine Microorganisms

Chemistry and Pharmacology of Naturally Occurring Bioactive Compounds

Biosynthesis, Characterization and Applications

Bioactive Natural products in Drug Discovery

Handbook on Drugs from Natural Sources

This timely book provides an overview of natural products/botanicals used for the management of insect-pest and diseases. It will help readers to update and widen their knowledge about natural products and their bio-activities against plant pathogens. The volume explores activity, chemistry, toxicity and geographic distribution of plants. Discussions concerning the methodology used for the detection of active principles, their mode of action and commercial prospects are of utmost importance and worthy of note. Focuses on recent achievements in natural bio-actives Global coverage of natural products / plants Targets the most important issues of natural botanicals/ biocides Includes innovative ideas with lucid explanations Contains specialized chapters, such as, natural control of multi-drug resistant organisms, anti-salmonella agents, natural house-dust-mite control agents, and naturally occurring anti-insect proteins, etc. Covers research on bioactives: From Lab to Field and Field to Market Includes eco-friendly and economically viable herbal technology

This volume is a comprehensive compilation of contributions on the state of the art knowledge about bioactive compounds including their sources, isolation methods, biological effects, health benefits and potential applications. These bioactive compounds could serve as alternatives in the prevention or treatment of multifactorial diseases for vulnerable population groups. Chapters in the book incorporate the knowledge based on traditional medicine with recent findings on bioactive molecules and their pharmaceutical implications in neurodegenerative diseases, cancer, COVID 19, diabetes, immunomodulation and farm animal diseases. The book also highlights the latest breakthroughs in the field of screening, characterization, and novel applications of natural bioactive compounds from diverse group of organisms ranging from bacteria, algae, fungi, higher plants, and marine sources. Authors from renowned institutions of India, Japan and China have shared their expertise in the contributed chapters with the goal of enhancing readers’ knowledge about the significance of use of bioactives in therapeutics and nutraceuticals. It is an informative reference for researchers, professors, graduate students, science enthusiasts, and all those who wish to gain insights into various aspects of bioactive compounds, and the development of new pharmaceutical constituents and nutraceuticals.

This new volume explores the importance of phytochemicals from plants in therapeutics, focusing on the extraction of bioactive compounds and their applications in human health. Natural products and their bioactive compounds are increasingly utilized in preventive and therapeutic medication as well as for the production of pharmaceutical supplements and, more recently, as food additives to increase the functionality of foods. The first section of the volume describes recent advances in the extraction of bioactive compounds from various sources. It looks at advanced extraction techniques such as enzyme-assisted, microwave-assisted, ultrasound-assisted, pressurized liquid extraction, and supercritical extraction techniques. Part 2, on bioactive compounds and health claims, covers the roles of different bioactive compounds and their health-promoting potential for lifestyle diseases. This section explains the botany, physical characteristics, uniqueness, uses, distribution, importance, phytochemistry, bioactivities, and future trends of different functional foods.

Phytochemicals as Lead Compounds for New Drug Discovery presents complete coverage of the recent advances in the discovery of phytochemicals from medicinal plants as models to the development of new drugs and chemical entities. Functional bioactive compounds of plant origin have been an invaluable source for many human therapeutic drugs and have played a major role in the treatment of diseases around the world. These compounds possess enormous structural and chemical diversity and have led to many important discoveries. This book presents fundament concepts and factors affecting the choice for plant-based products, as well as recent advances in computer-aided drug discovery and FDA drug candidacy acceptance criteria. It also details the various bioactive lead compounds and molecular targets for a range of life-threatening diseases including cancer, diabetes, and neurodegenerative diseases. Written by a global team of experts, Phytochemicals as Lead Compounds for New Drug Discovery is an ideal resource for drug developers, phytochemists, plant biochemists, food and medicinal chemists, nutritionists and toxicologists, chemical ecologists, taxonomists, analytical chemists, and other researchers in those fields. It will also be very valuable to professors, students, and researchers in this domain. Presents fundamental concepts and factors affecting choice for plant-based products Details the FDA drug candidacy acceptance criteria, including bottlenecks and way forward Highlights recent advances in computational-based drug discovery Focuses on the discovery of new drugs and potential druggable targets for the treatment of chronic diseases of world importance

This volume presents different aspects related to bioactive compounds, starting with their natural state in raw sources, physicochemical characterization and employment in pharmacy and medicine. The volume is divided into three parts. The first part describes the chemicals structure of bioactive compounds from different natural sources such as olive oils, wines, and medicinal plants. Special attention has been given to identifying the bioactive composition within variations of these natural sources (for example, extra virgin, ordinary or lampante olive oils). The second part of the volume presents the principal methods used for detecting, identifying and quantifying bioactive compounds. Emphasis is given to the use of different types of sensors or biosensors, and multisensor systems in combination with analytical techniques. The final part explains the principal methods for protection of bioactive compounds and the implication of bioactive compounds in pharmacy. This volume is a useful guide for novice researchers interested in learning research methods to study bioactive compounds. Frontiers in Bioactive Compounds brings edited reviews on the analysis and characterization of natural compounds of medicinal interest. Each volume covers useful information on a variety of natural sources as well as analytical techniques. This series is essential reading for analytical and medicinal chemists as well as professionals involved in natural and pharmaceutical product research and development.

The Benefits of Plant Extracts for Human Health

Biological Activity of Natural Products

Naturally Occurring Bioactive Compounds

Food Quality and Shelf Life

Biotechnological Production of Bioactive Compounds

Bioactive Natural Products

Water Extraction of Bioactive Compounds: From Plants to Drug Development draws together the expert knowledge of researchers from around the world to outline the essential knowledge and techniques required to successfully extract bioactive compounds for further study. The book is a practical tool for medicinal chemists, biochemists, pharmaceutical scientists and academics working in the discovery and development of drugs from natural sources. The discovery and extraction of bioactive plant compounds from natural sources is of growing interest to drug developers, adding greater fuel to a simultaneous search for efficient, green technologies to support this. Particularly promising are aqueous based methods, as water is a cheap, safe and abundant solvent. The book is a detailed guide to the fundamental concepts and necessary equipment needed to successfully undertake such processes, supported by application examples and highlighting the most influential variables. Part 1 begins with a thorough introduction to plants as sources of drugs, highlighting strategies for the discovery of novel bioactive constituents of botanicals, the need for standardization and a move toward more rational and greener techniques in the field, the development of plant-based extraction processes and pretreatments for the efficient extraction. Part 2 then reviews a broad range of available techniques, including sections on conventional hot water extraction and pressurized hot water extraction in a range of settings. Intensified processes are then discussed in detail, including sections on microwave-assisted processes, ultrasound-assisted processes and enzyme assisted extraction. Covers the theoretical background and range of techniques available to researchers, helping them to select the most appropriate extraction method for their needs Presents up-to-date and cutting edge applications by international experts Highlights current use and future potential for industrial scale applications Offers a thorough introduction to plants as sources of drugs, highlighting strategies for the discovery of novel bioactive constituents of botanicals

Bioactive Compounds from Natural Sources, Second EditionNatural Products as Lead Compounds in Drug DiscoveryCRC Press

Biotechnological Production of Bioactive Compounds provides insights on the most recent innovations, trends, concerns, solutions and practical challenges encountered in the fields of enzyme technology and nanobiotechnology for the production of bioactive materials with extra health benefits. As nanobiotechnology has improved the bioactive extraction process significantly, many bioactives, including bioflavonoids, omega-3 fatty acids, biopigments and low calorie sugar substitutes are a pivotal part of the food industry. The book highlights the production of extra health benefits “bioactives” from plants and microbes and explains how the extraction efficiency of bioactives molecules improves significantly with the recent advances in nanobiotechnology. Researchers in the fields of biochemical engineering, biotechnology, bioremediation, environmental sustainability and those in pharma industries will find the information in this book very helpful and illuminating. Outlines technological advances in bioactives extraction Covers bioflavonoids, biopigments, omega-3-fatty acids and low sugar substitutes Explains the mechanisms of Green cargo (biogenic nanoparticles) for the delivery of bioactive molecules

The first edition of Bioactive Compounds from Natural Sources was published in a period of renewed attention to biologically active compounds of natural origin. This trend has continued and intensified—natural products are again under the spotlight, in particular for their possible pharmacological applications. Largely focusing on natural products as lead compounds in drug discovery, Bioactive Compounds from Natural Sources, Second Edition: Natural Products as Lead Compounds in Drug Discovery is actually a completely new volume containing surveys of selected recent advances in an interdisciplinary area covering chemistry of natural products, medicinal chemistry, biochemistry, and other related topics. Written by some of the most reputed scientists in the field, this second edition includes new chapters from authors who contributed to the first edition as well as many chapters compiled by new authors. Introducing the reader to strategies and methods in the search for bioactive natural products, this book covers topics including: Natural sources of bioactive compounds such as aquatic cyanobacteria, filamentous fungi, and tropical plants, The tremendous potentiality of metabolic engineering of natural products biosynthesis The contribution of emerging or developing technologies to the study of bioactive natural compounds, namely computational methods and circular dichroism The potential of natural or natural-derived compounds for specific therapeutic applications: treatment of viral diseases, regulation of hypoxia-inducible factor, antimalarials, modulation of angiogenesis, and antitumor and wound-

healing activity Selected examples of natural product families and related synthetic analogues, namely polyphenols and camptothecins Compiled for researchers and Ph.D. students working in interdisciplinary fields, this book will also be appreciated by readers without a background in chemistry interested in bioactive natural products, their biological and pharmacological properties, and their possible use as chemopreventive or chemotherapeutic agents. Conversely, the biological and pharmacological data and methods are accessible by chemists.

Synthesis of Medicinal Agents from Plants highlights the importance of synthesizing medicinal agents from plants and outlines methods for performing it effectively. Beginning with an introduction to the significance of medicinal plants, the book goes on to provide a historical overview of drug synthesis before exploring how this can be used to successfully replicate and adapt the active agents from natural sources. Chapters then explore the medicinal properties of a number of important plants, before concluding with a discussion of the future of drugs from medicinal plants. Illustrated with real-world examples, it is a practical resource for researchers in this field. In an age of rapid environmental destruction, hundreds of medicinal plants are at risk of extinction from overexploitation and deforestation, limiting the natural resources available for active agent extraction, thereby threatening the discovery of future cures for diseases. Simultaneously, with the increasing population and advances in medical sciences, the demand for drugs is continuously increasing and cannot be met with just plants. The ability to synthetically replicate the active compounds from these plants is essential in creating an ecologically-aware, sustainable future for drug design Includes detailed coverage of therapeutic compound synthesis Uses multiple real-world examples to support content Lays out a sustainable template for the future of developing active agents from natural products

Human Health Benefits of Plant Bioactive Compounds

Sources and Applications

Bioactive Compounds from Plants as Antibacterial and Antioxidants

Volume 1: Production and Applications

Extraction, Applications, and Potential Health Benefits

Natural Products and Drug Development

Natural Bioactive Compounds: Technological Advancements deals with the latest breakthroughs in the field of screening, characterization and novel applications of natural bioactive compounds from diverse group of organisms ranging from bacteria, viruses, cyanobacteria, algae, fungi, bryophytes, higher plants, sponges, corals and fishes. Written by some of the most reputed scientists in the field, this book introduces the reader to strategies and methods in the search for bioactive natural products. It is an essential read for researchers and students interested in bioactive natural products, their biological and pharmacological properties, their possible use as chemopreventive or chemotherapeutic agents, and other future potential applications. Explores natural sources of bioactive compounds, including cyanobacteria, bacteria, viruses, fungi and higher plants Discusses the potential applications of biological products, such as their use in medicine (antibiotics, cancer research, immunology), as food additives, supplements and technological substances Analyzes the contributions of emerging or developing technologies for the study of bioactive natural compounds (characterization and purification)

Evolutionary Diversity as a Source for Anticancer Molecules

Bioactive Compounds from Plant Origin

Biotechnology of Bioactive Compounds

Natural Bioactive Compounds from Fruits and Vegetables as Health Promoters Part II

Natural Products as Source of Molecules with Therapeutic Potential

Microwave-assisted Extraction for Bioactive Compounds