

Branislav Ranković *Editor*

Lichen Secondary Metabolites

Bioactive Properties and
Pharmaceutical Potential

 Springer

Lichen Secondary Metabolites Bioactive Properties And Pharmaceutical Potential

**Sunil Kumar Deshmukh, Jacqueline
Aparecida Takahashi, Sanjai Saxena**



Lichen Secondary Metabolites Bioactive Properties And Pharmaceutical Potential:

Lichen Secondary Metabolites Branislav Ranković, 2014-12-31 The present book discusses in detail the nature and bioactive properties of lichen secondary metabolites Their therapeutic potential ranges from antibiotic to antioxidant and from anticarcinogenic to antiviral activity It further discusses their use in traditional medicine and highlights possible future directions in the study of their pharmaceutical potential *Chemistry, Biology and Pharmacology of Lichen* Ashoke Kumar Das, Ajay Sharma, Deepika Kathuria, Mohammad Javed Ansari, Garima Bhardwaj, 2024-06-10 Understand the properties and applications of one of the world's most ubiquitous flora Lichen is a single entity comprising two or more organisms most typically algae and fungus in a symbiotic relationship It is one of the planet's most abundant categories of flora with over 25 000 known species across all regions of the globe Lichens status as a rich source of bioactive metabolites and phytochemicals as well as their potential as bio indicators has given them an increasingly prominent role in modern research into medicine cosmetics food and more *Chemistry Biology and Pharmacology of Lichen* provides a comprehensive overview of these bountiful flora and their properties It provides not only in depth analysis of lichen physiology and ecology but also a thorough survey of their modern and growing applications It provides all the tools readers need to domesticate lichen and bring their properties to bear on some of humanity's most intractable scientific problems *Chemistry Biology and Pharmacology of Lichen* readers will also find Applications of lichen in fields ranging from food to cosmetics to nanoscience and beyond Detailed discussion of topics including lichen as habitats for other organisms lichens as anticancer drugs antimicrobial properties of lichen and many more Detailed discussion on key bioactive compounds from lichens *Chemistry Biology and Pharmacology of Lichen* is ideal for scientists and researchers in ethnobotany pharmacology chemistry and biology as well as teachers and students with an interest in biologically important lichens **Fungal Secondary Metabolites** Kamel A. Abd-Elsalam, Heba I. Mohamed, 2023-09-19 *Fungal Secondary Metabolites Synthesis and Applications in Agroecosystem* presents the properties and biotechnological applications of microbial metabolites and their industrial pharmaceutical antimicrobial and anticancer applications Chapters cover topics such as the role of fungal metabolites in the management of abiotic stress microbial alkaloids and their pharmaceutical and agricultural applications and fungal metabolites as novel plant pathogen antagonists Plant and agri food environmental scientists researchers graduate and post graduate students in related fields will find value in this reference which is published as part of the series *Nanobiotechnology for Plant Protection* Addresses the link between fungal secondary metabolites and health Covers cryptic genes and their link to the production of bioactive compounds Explores possibilities for producing bio based business solutions New and Future Developments in Microbial Biotechnology and Bioengineering Joginder Singh Panwar, Praveen Gehlot, 2020-09-21 *New and Future Developments in Microbial Biotechnology and Bioengineering* presents an account of recent developments and applied aspects of fungi and its metabolites for human welfare The fungi and its metabolites are employed in diverse fields of agri food biochemistry

chemical engineering diagnostics pharmaceuticals and medical device development The book contains chapters by the eminent researchers working with fungi and fungal metabolites who explain their importance and potential in manifold prospects The book includes a description of various fungal metabolites and their chemistry and biotechnology Highlights the latest developments surrounding the utilization of fungi and fungal metabolites Overviews applied aspects of fungi and their metabolites for human welfare Details the usage of fungi and their metabolites in diverse fields Identifies the importance and potential of fungi and fungal metabolites in manifold prospects Illustrates recent trends in fungal metabolite research using elaborate expressive tables and figures with concise information

Biological Potential and Medical Use of Secondary Metabolites

Metabolites Ana M. L. Seca, Diana Cláudia Pinto, 2019-07-26 Many macro and micro species from terrestrial and aquatic environments produce structurally unique compounds and in many countries still are the primary sources of medicines In fact secondary metabolites are an important source of chemotherapeutic agents but are also lead compounds for synthetic modification and the optimization of biological activity Therefore the exploitation of secondary metabolites or their inspired synthetic compounds offers excellent opportunities for the pharmaceutical industry This Medicines Special Issue focuses on the great potential of secondary metabolites for therapeutic application The Special Issue contains 16 articles reporting relevant experimental results and an overview of bioactive secondary metabolites their biological effects and new methodologies that improve and accelerate the process of obtaining lead compounds with regard to new drug development We would like to thank all 83 authors from all over the world for their valuable contributions to this Special Issue

Bioactive Compounds with Potential Medicinal Properties Derived from Fungi: Recent and Future Developments in Microbial Biotechnology Paola Angelini, Ahmed M. Abdel-Azeem, Carolina Elena Girometta, 2022-03-04

Biological Potential and Medical Use of Secondary Metabolites

Ana M. L. Seca, Diana Cláudia Pinto, 2019 Many macro and micro species from terrestrial and aquatic environments produce structurally unique compounds and in many countries still are the primary sources of medicines In fact secondary metabolites are an important source of chemotherapeutic agents but are also lead compounds for synthetic modification and the optimization of biological activity Therefore the exploitation of secondary metabolites or their inspired synthetic compounds offers excellent opportunities for the pharmaceutical industry This Medicines Special Issue focuses on the great potential of secondary metabolites for therapeutic application The Special Issue contains 16 articles reporting relevant experimental results and an overview of bioactive secondary metabolites their biological effects and new methodologies that improve and accelerate the process of obtaining lead compounds with regard to new drug development We would like to thank all 83 authors from all over the world for their valuable contributions to this Special Issue

Lichen-Derived Products Mohd Yusuf, 2020-09-01 The purpose of this book is to provide reference material that includes current developments along with a future outlook on the topic It is divided into two sections Morphological Overview and Extraction Prospects and Trends and Applications Part I contains four chapters that provide an overview and

systematically discuss the physical morphology suitability and extraction aspects of lichens and their secondary metabolites Part II includes eight chapters that give in depth insights on recent and valuable applications of lichen and their obtained products in several applied sectors including ethnopharmacology therapeutics paper and dye nutraceuticals cosmetics herbal industries etc Fungi Bioactive Metabolites Sunil Kumar Deshmukh, Jacqueline Aparecida Takahashi, Sanjai

Saxena, 2024-02-28 This book presents the exploration and exploitation of various bioactive metabolites obtained from fungi isolated from diverse habitats for pharmaceutical applications Various fungal sources have been brought under one umbrella ranging from endophytes marine fungi endolichenic fungi to fungi existing in the extremophilic conditions like desert and Antarctica and Arctic environment The book tries to cover maximally the range of the pharmaceutical applications wherein these bioactive agents from fungi have been exploited or are in the clinical pipelines and primarily include antibacterial antifungal antibiofilm anticancer antioxidant autoimmunological anti inflammatory and anti thrombotic diseases The book further emphasizes on the novel strategies to screen or enhance secondary metabolite production Some other topics includes peptides nonpeptides drugs pigments and enhancement of production of Echinocandin and Kojic acid The role of bioinformatics in drug discovery and biotransformations have also been discussed This book is going to be a comprehensive treatise and a valuable source for mycologists biotechnologists microbiologists biotechnologists and undertaking research in pharmaceutical sector as well as academia in setting up their research aspirations for using fungi in the process of drug discovery and development **Unlisted Drugs**, 1949 Plant Secondary Metabolites Santosh Kumar Upadhyay, Dev

Bukhsh Singh, 2025-09-12 This book explores the pharmacological potentials of various classes of plant secondary metabolites The initial chapter introduces the chemical diversity biosynthesis pathways and ecological functions of plant secondary metabolites It discusses the pivotal role of transcription factors in regulating their production Furthermore the book examines the specific classes of secondary metabolites such as phenolic compounds terpenes and anthocyanins highlighting their properties and various applications across the food cosmetics and pharmaceutical industries This book delves into emerging areas such as plant metabolites as nutraceuticals the utilization of horticultural and vegetable crops for secondary metabolite production and the exploration of staple crops for health improvements The chapters discuss the applications of fungal endosymbionts and algal sources in shaping plant metabolite compositions The chapters further review innovative techniques such as hairy root engineering and recombinant systems for enhancing metabolite production The book concludes with a detailed overview of methods for isolating and identifying secondary metabolites This book is an essential resource for students researchers and professionals of ethnopharmacology pharmaceutical sciences botany and biomedical sciences Key Features 1 Covers various classes of plant secondary metabolites and their pharmacological potentials 2 Explores the role of transcription factors in controlling secondary metabolite production in plants 3 Discusses secondary metabolites from horticultural and vegetable crops highlighting their pharmaceutical applications 4 Presents

techniques like hairy root engineering and recombinant systems for enhancing metabolite production

5 Examines lichen metabolites and their applications in human health as well as metabolites from gymnosperms Pharmaceutical Potential of Selected Lichen Species Erik A. Yeash, 2013 The challenge for today's pharmaceutical industry lies in the discovery and development of new pharmacologically active molecules Similar to higher plants lichens are important sources of biologically active compounds For a long time some species of lichens have been used in traditional medicine in the treatment of numerous infectious diseases The aim of this study was to analyze and test the secondary metabolites for antioxidant antibacterial and anticancer activities from four previously uninvestigated lichen species such as *Acarospora socialis* *Lobothallia praeradiosa* *Xanthoparmelia mexicana* and *Xanthomendoza fallax* The antioxidant activity of lichen extracts was assessed using the 1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical scavenging assay The crude ethanol extract from *A. socialis* at 100 mg/mL ethanol showed a significant free radical scavenging activity of 88% after exposure for 60 min The anticancer activity tests were performed at the Sanford Cancer Biology Research Center in Sioux Falls SD Two of the lichen extracts exhibited antitumor activities in excess of 50% The antibacterial activity also showed some promise as gram positive bacteria proved to be susceptible to certain *X. mexicana* extracts Further studies need to be carried out to establish the potential of the most promising lichens for biomedical applications Natural Bio-active Compounds Mohd Sayeed Akhtar, Mallappa Kumara Swamy, Uma Rani Sinniah, 2019-09-06 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 **Plant Specialized Metabolites** Jean-Michel Mérillon, Kishan Gopal Ramawat, 2025-04-29 This book offers a comprehensive and authoritative review of the biological and ecological roles played by specialized metabolites secondary metabolites in the life cycle of plants and it also covers the latest biotechnological advances in metabolite production and various industrial

applications Divided into three parts the book starts with an outline of the diverse biological effects of specialized metabolites on plant microbe and plant insect interactions soil health reproduction and human welfare In this first part readers will find topics such as the Importance of Plant Secondary Metabolites in modern therapy melatonin and inflammatory and immune modulated diseases antimicrobial and antiprotozoal potential of specialized metabolites the use of plant specialized metabolites in aromatherapy the role of tannins in cardiovascular diseases a pharmacological perspective on isoflavones and noncommunicable diseases algal secondary metabolites and plant specialized metabolites used as aphrodisiacs In Part II chapters present an overview of the ecological roles played by plant specialized metabolites in pollination plant defence agriculture and weed management among others In the third and final part of this book readers will discover the latest biotechnological approaches for bioactive compound production and identification including the discovery of bioactive specialized metabolites based on metabolomic approaches and a perspective on the industrial applications of plant specialized metabolites Given its breadth this book is of interest to botanists biotechnologists phytochemists industrialists environmentalists biologists and all those involved in the production and use of secondary specialized metabolites

Studies in Natural Products Chemistry Elfie Stocker-Wörgötter, Lucimara Mach Cortes Cordeiro, Marcello Iacomini, 2013-03-15 Lichens are fascinating symbiotic organisms biosynthesizing a broad spectrum of interesting secondary metabolites and polysaccharides A considerable number of them have been found to exert biological activities such as antibiotic antimycobacterial antiviral anti inflammatory analgesic antipyretic antiproliferative and cytotoxic effects Only a very low percentage of lichen substances have been actually screened for their biological activities and their potential therapeutic applications in medicine This is due to difficulties to obtain large quantities of lichens from nature isolated lichen fungi and algae from cultures for extractions Ten years ago we have started to bypass these problems by introducing first traditional and then by exploring novel microbiological techniques and advanced molecular tools for our culture experiments Case studies with selected cultured mycobionts and photobionts accumulating considerable quantities of a focused compound have been performed as tests for large scale culturing to be able to utilize facilities like phytotrons and bioreactors small scale bioreactors for future approaches Further studies have focused on the chemical identification of the metabolites from cultures and the genetic characterization of lichen PKS genes Polyketide synthase genes Another interesting group of lichen metabolites is cell wall polysaccharides All lichen species investigated so far produce these polymers in considerable amounts and many of them have been shown to exhibit antitumor immunostimulating antiviral as well as other types of biological activity Lichen polysaccharides are mainly of the following structural types glucans isolichenan nigeran pseudonigeran and pullulan glucans lichenan pustulan laminaran and lentinan type glucan galactomannans and complex heteroglycans galactoglucomannan galactomannoglucan rhamnopyranosylgalactofuranan and glucomannan Investigations on lichen polysaccharides were carried out using material extracted from the entire thallus with no mention of the origin of

component polymers fungal partner or photobiont In order to understand the contribution of the symbiotic partners to the polysaccharide present in the lichen thallus the carbohydrates produced by some aposymbiotically cultured mycobionts and photobionts Trebouxia Asterochloris and Coccomyxa were analyzed The studies demonstrated that most of the polysaccharides previously found in the symbiotic thalli were also produced by the aposymbiotically cultivated fungal partner while there were no similarities between the polysaccharides extracted from the photobiont with those from the respective lichen Surprisingly the photobionts synthesized very interesting polysaccharides such as galactofuranan mannogalactofuranan rhamnopyranosylgalactofuranan and an O methylated mannogalactan One of them was biologically active having in vitro activity on murine peritoneal macrophages

Natural Bioactive Compounds Rajeshwar P.

Sinha,h.c. Donat-P. Häder,2020-10-06 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

Bioprospecting of Natural Sources for Cosmeceuticals Deepika Kathuria,Ajay Sharma,Meenakshi

Verma,Gulzar Ahmad Nayik,2024-03-28 This book delves into the world of natural sources from medicinal plants microbes and fungi to lichen algae and clay minerals that have been used for centuries in traditional medicine These sources are rich in bioactive secondary metabolites that have a wide range of applications in various industries including cosmetics and personal care products This book provides a comprehensive guide to secondary metabolites for cosmeceutical purposes regulatory perspectives for cosmeceuticals in different countries and allergic responses from these secondary metabolites Additionally this book discusses the impact of nanotechnology on cosmetic products such as skin and hair care Bioprospecting of Natural Sources for Cosmeceuticals is a valuable resource for researchers and graduate students in chemistry botany biotechnology microbiology cosmetic science and the pharmaceutical sciences It is also useful for those researching traditional medicine systems and those in the microbiology biotechnology pharmaceutical and nanoscience industries

Assessment of Medicinal Plants for Human Health Megh R. Goyal,Durgesh Nandini Chauhan,2020-10-04

This volume looks at the importance of medicinal plants and their potential benefits for human health providing insight with

scientific evidence on the use of functional foods in the treatment and management of certain diseases Divided into four sections the volume covers the assessment and identification of medicinal plants the role of medicinal plants in disease management the ethnobotany and phytochemistry of medicinal plants and novel applications of plants Assessment of Medicinal Plants for Human Health Phytochemistry Disease Management and Novel Applications sheds light on the potential of certain plants and will be of value to faculty and advanced level students of natural products food science pharmacognosy pharmacology and biochemistry It will also be of interest to researchers in the area of drug discovery and development

Chemical and Biological Studies on Bioactive Secondary Metabolites from Fungal Source Alexander Otto, 2017* Fungi are an exceptional source of biologically active natural products which had and possibly will have a significant influence on the development of pharmaceutical and agricultural products Since less than 10% of the world's estimated fungal species are described by now it can be estimated that there is still an enormous potential to find new leads for crop protectants or drugs from chemically unexplored fungal sources The goal of this thesis was thus the isolation the structural characterization and biosynthesis studies of bioactive secondary metabolites from fungal source by using different concepts and methods of natural product chemistry Furthermore the biological activity of the isolated compounds was evaluated with special focus on phytopathogenic organisms

Secondary Metabolites from Manilkara Hexandra and Mimosa Elengi T A Prince, 2023-05-19 This book looks into the isolation characterization and biological studies of secondary metabolites from Manilkara Hexandra and Mimosa Elengi These two plants are known to possess a wide range of medicinal properties and the secondary metabolites obtained from them have been extensively studied for their potential therapeutic applications The book provides a comprehensive overview of the methods used for the isolation and characterization of these secondary metabolites including the use of modern analytical techniques such as HPLC NMR and mass spectrometry It also includes detailed studies on the biological activities of these compounds such as their antioxidant anti-inflammatory and antimicrobial properties The author presents a thorough analysis of the chemical structures of these secondary metabolites highlighting their potential for use in drug development and other biomedical applications The book also discusses the importance of these plants in traditional medicine and their potential as sources of new drug leads Overall this book is an essential resource for researchers and students interested in natural product chemistry pharmacology and drug discovery providing a valuable insight into the potential therapeutic applications of the secondary metabolites from Manilkara Hexandra and Mimosa Elengi

Unveiling the Energy of Verbal Beauty: An Emotional Sojourn through **Lichen Secondary Metabolites Bioactive Properties And Pharmaceutical Potential**

In some sort of inundated with displays and the cacophony of immediate interaction, the profound power and emotional resonance of verbal beauty frequently fade into obscurity, eclipsed by the continuous onslaught of noise and distractions. Yet, nestled within the lyrical pages of **Lichen Secondary Metabolites Bioactive Properties And Pharmaceutical Potential**, a captivating perform of fictional beauty that impulses with natural thoughts, lies an wonderful journey waiting to be embarked upon. Published by way of a virtuoso wordsmith, that interesting opus guides visitors on an emotional odyssey, gently exposing the latent potential and profound impact stuck within the complicated internet of language. Within the heart-wrenching expanse with this evocative evaluation, we will embark upon an introspective exploration of the book is main subjects, dissect its fascinating publishing model, and immerse ourselves in the indelible effect it leaves upon the depths of readers souls.

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