Phytochemical Analysis Methods

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Phytochemistry of Plants of Genus Piper Booktango

Tinospora cordifolia stem is used as a tonic, vitalizer, and as a remedy for metabolic disorders to treat allergies, diabetes, dysentery, jaundice, heart diseases, leprosy, rheumatoid arthritis, skin diseases, and urinary disorders. It shows anti-inflammatory, analgesic, antipyretic actions and immunosuppressive effects. This book focuses on providing gender and geographical location-based differences in the phytoconstituents of T. cordifolia by the liquid chromatography mass spectrometric method. These methods have potential use in the quality control of T. cordifolia and the screening of herbal preparations. Features: Compilation of ayurvedic features of one of the most important plants of the Indian system of medicines. Useful for all ayurvedic practitioners, researchers, faculty, students, and herbal product manufacturers. Application of advance hyphenated LC-MS techniques for variation study in phytoconstituents.

A Guide to Modern Techniques of Plant Analysis BoD – Books on Demand

Genus Terminalia is known to be a rich source of secondary metabolites, mainly polypohenols and triterpenoids. About 39 species have been phytochemically studied leading to the identification of 368 compounds. This work involves the use of hyphenated mass spectrometric methods such as HPLC-ESI-QTOF-MS/MS and UPLC-ESI-QqQLIT-MS/MS for qualitative and quantitative analysis of major bioactive constituents in selected medicinal plants without isolation. It also describes the methods of mass fingerprinting and their use to investigate the plant species variations with the help of statistical software ' s (PCA). Markers were identified for quality control and authentications.

Medicinal Plants: Biodiversity, Sustainable Utilization and Conservation Springer Science & Business Media

Cassia is an indigenous plant in Africa, Latin America, Northern Australia and Southeast Asia. Several Cassia species are of high commercial and medicinal significance since they are used as spices and in traditional medicines. Currently plants from genus Cassia is in great demand due to their immense medicinal properties. Cassia species have various pharmacological activities such as antibacterial, analgesic, antiinflammatory, antiarthritic, hepatoprotective, antitumor, antifertility, antifungal, antioxidant, antileishmaniatic, antimicrobial, CNS and hypoglycaemic activitiy. Different class of compounds reported from Cassia species are anthraquinones, phenolics, flavonoids, chromenes, terpenes, proanthocyanidins, coumarins, chromones and lignans. The taxonomy and nomenclature of Cassia species are quite complex. It is very difficult to differentiate them due to their overlapping morphological characters and close similarities. This usually leads to misidentification and misinterpretation of the components. Features: Presents collection of Ayurvedic features and scientific evidence of most important medicinal plants of Cassia species Chemical signatures for identification of Cassia species Easy to use analytical procedure for quality control of Cassia species and its products.

Source of Antioxidants and Role in Disease Prevention CRC Press

There are over 750,000 plants on earth; relatively only a few of these have been studied scientifically. Modern pharmacology looks for one active ingredient and seeks to isolate it to the exclusion of all the others. Most research on plants continues to focus on identifying and isolating active ingredients rather than studying the medicinal properties of the whole plant. The isolation, purification and identification of active ingredients of one of such medicinal plants that was studied is Ficus platyphylla (Moraceae). Phytochemical analysis of Ficus platyphylla was uniquely designed to give professionals on natural products studies and students an overview of the phytochemical compounds, accepted analytical methods for the isolation of pure compounds and the spectroscopic techniques required for their identification. The research protocols adopted in an impecunious system leading to the isolation of a compound for the first time from the bark of Ficus platyphylla is discussed.

Phytochemical Dictionary Springer Nature

Piper is the representative genus of family Piperaceae. Piper species are pan-tropical in distribution and found in both the hemispheres. As the king of all spices, black pepper, Piper nigrum, led to the global expeditions culminating in the discovery of India and the new world. Piper species have been reported to possess various pharmacological activities such as insecticidal, antibacterial, anti-inflammatory, antiplatelet, anti-hypertensive, antithyroid, antitumor activities and hepatoprotective properties. Botanical authentication of the plants of Piper species is difficult because of the morphological similarity among the species. This book describes ultra-performance liquid chromatography coupled with triple quadrupole electrospray tandem mass spectrometry in multiple reactions monitoring (MRM) mode to study the quantitative variation of thirteen bioactive markers in different plant parts of ten Piper species. Features: Collection of Ayurvedic features and scientific evidence of the most important medicinal plants of Piper species. Describes chemical signatures for identification of Piper species. Provides easy-to-use analytical procedure for quality control of Piper species and its products.

Phytochemistry of Medicinal Plants BoD – Books on Demand

Phytochemicals from medicinal plants are receiving ever greater attention in the scientific literature, in medicine, and in the world economy in general. For example, the global value of plant-derived pharmaceuticals will reach $500 billion in the year 2000 in the OECD countries. In the developing countries, over-the-counter remedies and "ethical phytomedicines," which are standardized toxicologically and clinically defined crude drugs, are seen as a promising low cost alternatives in primary health care. The field also has benefited greatly in recent years from the interaction of the study of traditional ethnobotanical knowledge and the application of modem phytochemical analysis and biological activity studies to medicinal plants. The papers on this topic assembled in the present volume were presented at the annual meeting of the Phytochemical Society of North America, held in Mexico City, August 15-19, 1994. This meeting location was chosen at the time of entry of Mexico into the North American Free Trade Agreement as another way to celebrate the closer ties between Mexico, the United States, and Canada. The meeting site was the historic Calinda Geneve Hotel in Mexico City, a most appropriate site to host a group of phytochemists, since it was the address of Russel Marker. Marker lived at the hotel, and his famous papers on steroidal saponins from Dioscorea composita, which launched the birth control pill, bear the address of the hotel.

Medicinal Plants and Traditional Medicine in Africa Springer Science & Business Media

Plants are a very important source of nutrients and a very important part in the human diet. They provide us carbohydrates, protein, vitamins, cholesterol lowering compounds, antioxidants and other important sources of biologically active substances. Many nutritional values of plants have been discussed in the literature but there is very limited research in the biologically active compounds that are present in them. These biologically active compounds are called as phytochemicals. These phytochemicals are derived from every part of the plant including roots, stem, leaves, flowers, fruits, seeds etc. These phytochemicals are sometimes used as such and in some cases they form the raw materials for a variety of other medicinally important compounds. Medicinal plants are a gift to us from the nature as they provide a number of health benefits to us. In India these medicinal plants are used for about centuries for their properties and are still used to this date. India has a variety of traditional medical systems like Ayurveda, siddha, unani and a huge class of ethnomedicine. This knowledge of medicine was disappeared due to the modernisation that has been on us on the past and is reappearing again as their importance have been realized and lack of side effects are also an important aspect in these types of traditional medicine. Medicinal plants are very important in health care of individuals and communities in many developing countries. Medicinal plants are believed to be much safer and are used in treatment of various ailments .The plants provide the basic nutrients needed for the growth of animals and humans like proteins, carbohydrates, fats, vitamins and oils minerals. These plant compounds are used as alternative medicine and have become popular all over the world. They are also used in everyday medicines that we take in our daily life without even knowing that these plant compounds are present, the plant are also used as nutraceutical supplements for improving nutritional intake.This book deals with the methods that are involved in the identification and analysis of such novel compounds that are useful in the field of drug discovery and other application of these valuable plant compounds.

Handbook of Phytochemical Constituent Grass, Herbs and Other Economic Plants CRC Press

Since the beginning of human civilization, plants have been our true companions. Plants contribute not only to our existence but also serve us through discovery, design and the treatment of various diseases where there is no satisfactory cure in modern medicine. This has focused Natural Product Chemists to unravel plants therapeutic potential in the light of modern analytical and pharmacological understandings. Presence of multiple active phytochemicals in medicinal plants offers exciting opportunity for the development of novel therapeutics, providing scientific justification for their use in traditional medicines. Non-food plants have been recognized as biofactories for the production of eco-friendly value added materials including agricultural, food products, enzymes, nutraceuticals etc. They have also been widely explored for personal care, industrial products and sources of energy generation. The proven efficacy of botanicals has been appreciated by the scientific community and strengthened plant-human relationship. The synergism in the Phytoproducts, the result of the interaction of two or more moieties, is not simply additive but multiplicative. Recent acceptance of the Food and Drug Administration (US) for herbal-medicine based preparation has renewed interest in Natural Product Research. The year 2011 is declared as the International Year of Chemistry (IYC 2011) by the United Nations Assembly. On this occasion, the present conference CPHEE 2011 aims to offer chemists from diverse areas to come to a common platform to share the knowledge and unveil the chemistry and magic potentials of phytoproducts for the mankind.

(A Brief Guide of Methods Used in Phytochemistry Research) CRC Press

This long awaited third edition of Phytochemical Methods is, as its predecessors, a key tool for undergraduates, research workers in plant biochemistry, plant taxonomists and any researchers in related areas where the analysis of organic plant components is key to their investigations. Phytochemistry is a rapidly expanding area with new techniques being developed and existing ones perfected and

made easier to incorporate as standard methods in the laboratory. This latest edition includes descriptions of the most up-to-date methods such as HPLC and the increasingly sophisticated NMR and related spectral techniques. Other methods described are the use of NMR to locate substances within the plant cell and the chiral separation of essential oils. After an introductory chapter on methods of plant analysis, individual chapters describe methods of identifying the different type of plant molecules: phenolic compounds, terpenoids, organic acids, lipids and related compounds, nitrogen compounds, sugar and derivatives and macromolecules. Different methods are discussed and recommended, and guidance provided for the analysis of compounds of special physiological relevance such as endogenous growth regulators, substances of pharmacological interest and screening methods for the detection of substances for taxonomic purposes. It also includes an important bibliographic guide to specialized texts. This comprehensive book constitutes a unique and indispensable practical guide for any phytochemistry or related laboratory, and provides hands-on description of experimental techniques so that students and researchers can become familiar with these invaluable methods.

Handbook of Plant Food Phytochemicals LAP Lambert Academic Publishing

Chemoprevention of Esophageal Squamous Cell Carcinoma with Berries, by Gary D. Stoner and Li-Shu Wang Cancer Prevention by Different Forms of Tocopherols, by Chung S. Yang and Nanjoo Suh Cancer Chemopreventive and Therapeutic Potential of Guggulsterone, by Inas Almazari and Young-Joon Surh Inhibition of UVB-Induced Nonmelanoma Skin Cancer: A Path from Tea to Caffeine to Exercise to Decreased Tissue Fat, by Allan H. Conney, You-Rong Lou, Paul Nghiem, Jamie J. Bernard, George C. Wagner and Yao-Ping Lu Cancer Chemoprevention and Nutri-Epigenetics: State of the Art and Future Challenges, by Clarissa Gerhauser A Perspective on Dietary Phytochemicals and Cancer Chemoprevention: Oxidative Stress, Nrf2, and Epigenomics, by Zheng-Yuan Su, Limin Shu, Tin Oo Khor, Jong Hun Lee, Francisco Fuentes and Ah-Ng Tony Kong Keap1-Nrf2 Signaling: A Target for Cancer Prevention by Sulforaphane, by Thomas W. Kensler, Patricia A. Egner, Abena S. Agyeman, Kala Visvanathan, John D. Groopman, Jian-Guo Chen, Tao-Yang Chen, Jed W. Fahey and Paul Talalay Chemoprotection Against Cancer by Isothiocyanates: A Focus on the Animal Models and the Protective Mechanisms, by Albena T. Dinkova-Kostova Human Cancer Chemoprevention: Hurdles and Challenges, by Vaqar Mustafa Adhami and Hasan Mukhtar Personalizing Lung Cancer Prevention Through a Reverse Migration Strategy, by Kathryn A. Gold, Edward S. Kim, Ignacio I. Wistuba and Waun K. Hong Natural-Agent Mechanisms and Early-Phase Clinical Development, by Janet L. Wang, Kathryn A. Gold and Scott M. Lippman

Phytochemistry of Withania somnifera Routledge

Here is the most complete guide available for the analysis of tannins. A battery of tannin methodologies is presented in a simple, clear and easy-to-understand manner. This unique guide covers chemical, biological and radio isotopic tannin assays. Comprehensive step-by-step protocols are presented for each method. The protocols enable non-specialists and specialists alike to implement the methods easily in the laboratory. It is an ideal laboratory manual for research scientists, graduate students, and laboratory personnel working in the fields of animal nutrition, soil nutrient management, wild life-plant interactions, and plant breeding.

Natural Products in Cancer Prevention and Therapy Springer Science & Business Media

Naturally present bioactive compounds in plants are referred to as "Phytochemicals" and are being studied extensively for their role in human health. Studies have shown that they can have an important role to play in the prevention and management of several human diseases. Recognizing the increasing interest in this area, this book is being published in response to the need for more current information globally about phytochemicals and their role in human health. Chapters of the book are authored by internationally recognized authors who are experts in their respective field of expertise. The chapters represent both original research as well as up-to-date and comprehensive reviews. We are sure that the book will be an important reference source meeting the needs of a wide range of interest groups.

Phytochemistry of Plants of Genus Cassia John Wiley & Sons

This new volume provides a bird’s-eye view of the properties, utilization, and importance of high resolution mass spectrometry (HRMS) for phytochemical analysis. The book discusses the new and state-of-the-art technologies related to HRMS in phytochemical analysis for the food industry in a comprehensive manner. Phytochemical characterization of plants is important in the food and nutraceutical industries and is also necessary in the procedures followed for drug development, toxicology determination, forensic studies, origin verification, quality assurance, etc. Easy determination of active compounds and isolation as well as purification of the same from natural matrices are required, and the possibilities and advantages of HRMS pave the way for improved analysis patterns in phytochemistry. This book is unique in that its sole consideration is on the importance of HRMS in the field of phytochemical analysis. Along with an overview of basic instrumental information, the volume provides a detailed account of data processing and dereplication strategies. Technologies such as bioanalytical techniques and bioassays are considered also to provide support for the functions of the instruments used. In addition, a case study is presented to depict the complete phytochemical characterization of a matrix by HRMS. The book covers processing and computational techniques, dereplication, hyphenation, high-resolution bioassays, bioanalytical screening/purification techniques, applications of gas chromatography–high-resolution mass spectrometry, and more. Key features: Covers the fundamental instrumentation and techniques Discusses HRMS-based phytochemical research details Focuses strictly on the phytochemical considerations High-Resolution Mass Spectroscopy for Phytochemical Analysis: State-of-the-Art Applications and Techniques will be a valuable reference guide and resource for researchers, faculty and students in related fields, as well as those in the phytochemical industries.

Phytochemical Profiling of Commercially Important South African Plants John Wiley & Sons

Phytochemicals are plant derived chemicals which may bestowhealth benefits when consumed, whether medicinally or as part of abalanced diet. Given that plant foods are a major component of mostdiets worldwide, it is unsurprising that these foods represent thegreatest source of phytochemicals for most people. Yet it is onlyrelatively recently that due recognition has been given to theimportance of phytochemicals in maintaining our health. Newevidence for the role of specific plant food phytochemicals inprotecting against the onset of diseases such as cancers and heartdisease is continually being put forward. The increasing awarenessof consumers of the link between diet and health has exponentiallyincreased the number of scientific studies into the biologicaleffects of these substances. The Handbook of Plant Food Phytochemicals provides acomprehensive overview of the occurrence, significance and factorseffecting phytochemicals in plant foods. A key of objective of thebook is to critically evaluate these aspects. Evaluation ofthe evidence for and against the quantifiable health benefits beingimparted as expressed in terms of the reduction in the risk ofdisease conferred through the consumption of foods that are rich inphytochemicals. With world-leading editors and contributors, the Handbook ofPlant Food Phytochemicals is an invaluable, cutting-edgeresource for food scientists, nutritionists and plant biochemists.It covers the processing techniques aimed at the production ofphytochemical-rich foods which can have a role indisease-prevention, making it ideal for both the food industry andthose who are researching the health benefits of particular foods.Lecturers and advanced students will find it a helpful and readableguide to a constantly expanding subject area.

Chemistry of Phytopotentials: Health, Energy and Environmental Perspectives CRC Press

To quantify antioxidants in natural sources, the application of chromatography techniques with different detectors followed by skillful sample preparation is necessary. Analysis of Antioxidant-Rich Phytochemicals is the first book that specifically covers and summarizes the details of sample preparation procedures and methods developed to identify and quantify various types of natural antioxidants in foods. Focusing on the principle of quantification methods for natural antioxidants, the book reviews and summarizes current methods used in the determination of antioxidant-rich phytochemicals in different sources. Chapter by chapter, the distinguished team of authors describes the various methods used for analysis of the different antioxidant-rich phytochemicals – phenolic acids; carotenoids; anthocyanins; ellagitannins, flavonols and flavones; catechins and procyanidins; flavanones; stilbenes; phytosterols; and tocopherols and tocotrienols. Going beyond extensive reviews of the scientific literature, the expert contributors call on their accumulated experience in sample extraction and analysis to outline procedures, identify potential problems in dealing with different samples, and offer trouble-shooting tips for the analysis. Analysis of Antioxidant-Rich Phytochemicals covers the important food applications and health-promoting functions of the major antioxidant phytochemicals, presents general analysis principles and procedures, and systematically reviews and summarizes the various analytical methods necessary for each type of natural antioxidant in different food sources.

Phytochemical Methods Independently Published

Withania is a genus of the nightshade family of flowering plants distributed in the subtropical regions from the Mediterranean to South East Asia. Only two species, W. somnifera and W. coagulans, are found in India. The most common species is W. somnifera (WS), which occurs naturally in the subtropical regions from the Mediterranean through Africa to the Middle East, the Indian Continent, Sri Lanka, South East Asia, subtropical America and Australia. It is a perennial shrub that grows to 75 cm (.75 m) tall with tomentose branches, oval yellowish green leaves, orange red berries and a papery calyx, and it survives harsher climatic conditions. In Ayurveda it is believed the plants which survive harsh conditions have strong healing and tonification properties. The main bioactive phytoconstituents of WS are withanolides (steroidal lactones), alkaloids, flavonoids, sterols, phenolics and others. Among the various withanolides, withanolide A, withaferin A, withanone and withanolide D are the most abundant, having various activities. WS is a wonder herb with a broad spectrum of pharmacological properties, such as antioxidant, antidepressant, aphrodisiac, antiulcerogenic, antivenom, anti-inflammatory, antiarthritic, anticancer, antiparasitic, antimicrobial, anticancerous, antidiabetic, antitumor, hemopoetic neuroregenerative, immunomodulatory, cardioprotective, radio-sensitizing, rejuvenating, antistress, sedative, hypoglycemic, thyroprotective, adaptogenic, antispasmodic, immunomodulatory, immunostimulant and antiaging properties. The simultaneous quantitative analysis of six major bioactive withanolides in five varieties of WS and in different plant parts (root, stem and leaf) of WS was accomplished. This method is also applicable to control the quality of commercially formulated products which contain WS bioactive compounds. Results indicated the WS variety NMITLI-135 showed the maximum abundance of withanolides at pH 8.5, EC-0.5 dS m?1, ESP-13 in sodic soil. Our results showed this readily available, rapid and reliable method is suitable for the routine analysis and effective quality control of raw materials and finished products. FEATURES Presents a collection of Ayurvedic features and scientific analytical and pharmacological evidence of important medicinal plants of Withania somnifera Useful for natural product researchers, faculty, students and herbal product manufacturers Uses advanced hyphenated techniques for assessing phytoconstituents

A Guide to Modern Techniques of Plant Analysis CRC Press

Phytochemicals are the individual chemicals from which the plants are made and plants are the key sources of raw material for both pharmaceutical and aromatic industries. the improved methods for higher yield of active compounds will be the major incentive in these industries. To help those who are involved in the isolation of compounds from plants, some of the essential phytochemical techniques are included in this book. The theoretical principles of various instruments, handling of samples and interpretation of spectra are given in detail. Adequate chemical formulas are included to support and explain

various structures of compounds and techniques. The book will prove useful to students, researchers, professionals in the field of Plant Physiology and Pathology, Pharmaceutical and Chemical Engineering, Biotechnology, Medicinal and Aromatic Plants and Horticulture.

Phytochemical Methods CRC Press

Global dietary recommendations emphasize the consumption of plant-based foods for the prevention and management of chronic diseases. Plants contain many biologically active compounds referred to as phytochemicals or functional ingredients. These compounds play an important role in human health. Prior to establishing the safety and health benefits of these compounds, they must first be isolated, purified, and their physico-chemical properties established. Once identified, their mechanisms of actions are studied. The chapters are arranged in the order from isolation, purification and identification to in vivo and clinical studies, there by covering not only the analytical procedures used but also their nutraceutical and therapeutic properties.

Volume 1: Fundamentals, Modern Techniques, and Applications Elsevier

The pharmacopoeias of most African countries are available and contain an impressive number of medicinal plants used for various therapeutic purposes. Many African scholars have distinguished themselves in the fields of organic chemistry, pharmacology, and pharmacognosy and other areas related to the study of plant medicinal plants. However, until now, there is no global standard book on the nature and specificity of chemicals isolated in African medicinal plants, as well as a book bringing together and discussing the main bioactive metabolites of these plants. This book explores the essence of natural substances from African medicinal plants and their pharmacological potential. In light of possible academic use, this book also scans the bulk of African medicinal plants extract having promising pharmacological activities. The book contains data of biologically active plants of Africa, plant occurring compounds and synthesis pathways of secondary metabolites. This book explores the essence of natural substances from African medicinal plants and their pharmacological potential The authors are world reknowned African Scientists.

Phytochemical Methods A Guide to Modern Techniques of Plant Analysis CRC Press

Computational Phytochemistry explores how recent advances in computational techniques and methods have been embraced by phytochemical researchers to enhance many of their operations, thus refocusing and expanding the possibilities of phytochemical studies. By applying computational aids and mathematical models to extraction, isolation, structure determination and bioactivity testing, researchers can extract highly detailed information about phytochemicals and optimize working approaches. This book aims to support and encourage researchers currently working with, or looking to incorporate, computational methods into their phytochemical work. Topics in this book include computational methods for predicting medicinal properties, optimizing extraction, isolating plant secondary metabolites and building dereplicated phytochemical libraries. The role of high-throughput screening, spectral data for structural prediction, plant metabolomics and biosynthesis are all reviewed, before the application of computational aids for assessing bioactivities and virtual screening are discussed. Illustrated with detailed figures and supported by practical examples, this book is an indispensable guide for all those involved with the identification, extraction and application of active agents from natural products. Includes step-by-step protocols for various computational and mathematical approaches applied to phytochemical research Features clearly illustrated chapters contributed by highly reputed researchers Covers all key areas in phytochemical research, including virtual screening and metabolomics