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Antioxidant activity of medicinal spices and aromatic herbs

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Received for publication January 15, 2012; accepted Feburary 20, 2012.

Abstract

Essential oils of many plants besides having a strong and pleasant aroma also are biologically active as an anticoxidant. They have an important economic role in the medical and pharmaceutical industries, aromatherapy and cosmetology, production of natural food flavorings and as natural preservative. A variety of free radical scavenging anticoxidants are found in dietary sources like fruits, vegetables, aromatic herbs, spices etc. The anticoxidant role of aromatic principles also have medicinal effects and play important roles in long term health, reduction in the risk of chronic and degenerative diseases and preventing cellular damage, when included in regular diet. Considering the highly significant medicinal role of antioxidant, in the present investigation, effort is made to find out the anticoxidant capacity of hexane extracts of 15 aromatic herbs and spices. Antioxidant activity screening assays implemented here is % DPPH radical scavenging activity (RSA). All the plant extracts have shown an excellent activity. The highest activity recorded in the present assay is with Orimum nanctum extract 76.608 ± 0.063 % for DPPH radical scavenging activity.

Key words: Plant extracts, essential oils, antioxidant, free radicals, chronic and degenerative diseases

Introduction

Plants synthesize essential oils to protect from infections and parasites. The essential oils are the secondary metabolites of the aromatic plants which include the fragrant material present in any part from the root, bark, wood, seed, fruit, leaf, flower or in the whole plant (Yoo et al., 2008). Essential oils are made of a complex mixture of organic substances with different functional groups like phenolic compounds containing hydroxyl groups (-08) and low molecular volutile terpenoids mainly mono- and sesquiterpenes (Kitazurua et al., 2004; Misharina et al., 2009). Many aromatic plants are medicinally important due to these secondary compounds and their usage in regular diet, not only serve as fragrance and flavoring agents but also as dietary antioxidant.

Antioxidant inhibits oxidation process even at relatively small concentration by acting as a radical scavenger, oxygen scavenger, triplet and singlet form. They possess diverse physiological roles in the body and are a key for good health. Antioxidants are likely to prevent several chronic diseases caused by free radicals such as atheroscelerosis, cancer, diabetes, arthritis, inflammation, cardiovascular and ageing related problems (Kaur and Kapoor, 2001; Apak et al., 2007; Markowicz et al., 2007). Furthermore, they inhibit other food deterioration affecting its nutritional quality and flavor by preventing lipid peroxidation and microbial spoilage and works as a natural preservative agent (Kaur and Kapoor, 2001; Singh et al., 2004; Juki et al., 2006; Markowicz et al., 2007). Thus, nowadays, herbs and spices have great potential in a growing nutrition industry (Samojlik et al., 2010).

Thus, in recent decades, there has been great interest in screening essential oils and various plant extracts to obtain natural antioxidants with broad-spectrum actions (Wu et al., 2009). However, despite of huge medicinal value of Indian medicinal plants, their rich diversity is yet to be scientifically evaluated for such properties.

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Antioxidant Activity Of Medicinal Spices And Aromatic Herbs

Rajkumar Rajendram, Victor Preedy, Vinood Patel

Antioxidant Activity Of Medicinal Spices And Aromatic Herbs:

Antioxidant Properties of Spices, Herbs and Other Sources Denys J. Charles, 2012-11-27 The scientific world and modern society today is experiencing the dawning of an era of herbal medicine Extensive research has shown that aromatic plants are important anti inflammatory antioxidant anti aging and immune boosting delectable foods with the magic and miracle to boost our immune system providing us with extended and an improved quality of life Apart from making bland recipes into welcoming or interesting victories herbs and spices have stirred the minds of the research community to look deeper into its active components from a functional perspective It is essential to present the scientific and medicinal aspect of herbs and spices together with the analysis of constituents its medicinal application toxicology and its physiological effects Herbs and spices with high levels of antioxidants are in great demand as they tend to promote health and prevent diseases naturally assuring increased safety and reliability for consumers Herbs and spices are not only known for taste and flavor but today research has opened up a new realm in which the antioxidant properties of these aromatic plants provide preservation for foods and health benefits for consumers who look forward to concrete scientific research to guide them further and explore herbal medicine The aim of this book is to create awareness in society about the reliability of medicinal properties of certain herbs and spices through scientific and scholarly research Aromatic Herbs in Food Charis M. Galanakis, 2021-01-19 Aromatic Herbs in Food Bioactive Compounds Processing and Applications thoroughly explores three critical dimensions properties of bioactive compounds recovery and applications The book covers the most trending topics in herbs applications putting emphasis on the health components of spices and herbs their culinary use their application for the treatment of functional gastrointestinal disorders quality and safety requirements for usage in foods processing extraction technologies green extraction technologies encapsulation of recovered bioactives applications and interactions with food components applications as food supplements for weight loss usage in active food packaging the applications of rosemary and sage extracts and much more This book is ideal for food scientists technologists engineers and chemists working in the whole food science field In addition nutrition researchers working on food applications and food processing will find the content very valuable Covers all the important aspects of herbs such as properties processing recovery issues and their applications Brings the health components of spices and herbs their culinary use and applications for the treatment of functional gastrointestinal disorders Explores herbs processing extraction technologies green extraction technologies encapsulation of recovered bioactives applications and interactions with food components

Pharmaceutical Properties of Some Common Spices R. Nirmala, 2022-07-03 Medicinal and Aromatic Plants Lakhan Kumar, Navneeta Bharadvaja, Ram Singh, Raksha Anand, 2024-08-17 Due to complex phytochemical components and associated beneficial properties numerous medicinal and aromatic plants in whole or parts have been used for nutritional purposes or the treatment of various diseases and disorders in humans and animals Essential oils from medicinal and aromatic plants MAPs have been exploited for

product formulations of pharmaceuticals cosmetics food and beverage colorants biopesticides and several other utility chemicals of industrial importance There is scientific evidence of many medicinal plant extracts possessing immunomodulatory immunostimulatory antidiabetic anticarcinogenic antimicrobial and antioxidant properties thus demonstrating their traditional use in popular medicine With the advent of modern technology the exploitation of natural resources has exponentially increased in order to fulfill the demand of an increased human population with improved quality of life The traditional agriculture and production based supply of commodities is inadequate to meet the current demand Biotechnological approaches are gaining importance to bridge the gaps in demand and supply In the proposed book medicinal and aromatic plant based secondary metabolites have been discussed in terms of their therapeutic potential and industrial relevance To discuss the qualitative and quantitative analysis of a range of medicinal and aromatic plants based secondary metabolites SMs bioprocess development for their extraction and bioseparation a brief overview of their industrial relevance various tissue culturing strategies biotechnological approaches to enhance production scale up strategies management of residual biomass post extraction of target SMs is central to the idea of the proposed book A section will explore the verticals mentioned above In the next section the book addresses the approaches for conserving and improving medicinal and aromatic plant genetic resources In the third section approaches to managing the post harvest crop residue and secondary metabolites extracted plant biomass will be thoroughly discussed The recent integration of artificial intelligence to improve medicinal and aromatic plant research at several levels including the development and employment of computational approaches to enhance secondary metabolite production tissue culture drug design and discovery and disease treatment will be included in the fourth section The book summarizes current research status gaps in knowledge agro industrial potential waste or residual plant biomass management conservation strategies and computational approaches in the area of medicinal and aromatic plants with an aim to translate biotechnological interventions into reality Medicinal Plants of South Asia Muhammad Asif Hanif, Haq Nawaz, Muhammad Mumtaz Khan, Hugh J. Byrne, 2019-09-14 Medicinal Plants of South Asia Novel Sources for Drug Discovery provides a comprehensive review of medicinal plants of this region highlighting chemical components of high potential and applying the latest technology to reveal the underlying chemistry and active components of traditionally used medicinal plants Drawing on the vast experience of its expert editors and authors the book provides a contemporary guide source on these novel chemical structures thus making it a useful resource for medicinal chemists phytochemists pharmaceutical scientists and everyone involved in the use sales discovery and development of drugs from natural sources Provides comprehensive reviews of 50 medicinal plants and their key properties Examines the background and botany of each source before going on to discuss underlying phytochemistry and chemical compositions Links phytochemical properties with pharmacological activities Supports data with extensive laboratory studies of traditional medicines Antioxidants, 2019-11-06 Antioxidants are substances that can prevent or slow damage to living cells caused

by free radicals which are unstable molecules the body produces as a reaction to environmental and other pressures Sometimes called free radical scavengers free radicals can cause mutation in different biological compounds such as protein nucleic acids and lipids which lead to various diseases cancer cardiovascular disease aging etc Healthy foods are considered a main source of antioxidant compounds and from the beginning of a person s life a strong relationship is seen between antioxidant compounds and the prevention of certain diseases such as types of inflammations cardiovascular diseases and different kinds of cancers It is thus of great importance that new data relating to antioxidants and their biological activity be collected and that antioxidant modes of action be illustrated Experts from around the world contributed to the current book discussing antioxidant sources modes of action and their relation to human diseases Twenty five chapters are presented in two sections Antioxidants Sources and Modes of Action and Antioxidants Compounds and Diseases Antioxidant Activity of Polyphenolic Plant Extracts Dimitrios Stagos, 2021-03-19 Antioxidant Activity of Polyphenolic Plant Extracts is a collection of scientific articles regarding polyphenols that is substances occurring naturally in plants and exhibiting many beneficial effects on human health Among polyphenols interesting biological properties their antioxidant activity is considered the most important This book brings together experts from different research fields on topics related to polyphenols such as their isolation and purification assessment of their antioxidant activity prevention from oxidative stress induced diseases and use as food additives The polyphenols used in the present studies are derived from a great variety of plants ranging from well known species to rare ones that are only found in specific regions Moreover some of the studies provide evidence that polyphenols may be used for the prevention and treatment of common diseases such as diabetes mellitus Alzheimers disease cardiovascular and intestinal diseases Importantly in several of the studies green extraction methods for the isolation of polyphenols were developed using modern technologies where few or no organic solvents were used in order to minimize environmental and health impacts Herbs and Spices Rabia Shabir Ahmad, 2021-12-01 Herbs and Spices New Processing Technologies is a collection of research and review chapters offering a comprehensive overview of recent developments in the field of herbs and spices with a focus on plants containing bioactive components and the utilization of novel processing technologies in the development of functional products The book consists of four sections containing fourteen chapters written by various researchers and edited by an expert active in the research of plants and bioactive compounds

Antioxidants in Plant-Microbe Interaction Harikesh Bahadur Singh, Anukool Vaishnav, R.Z. Sayyed, 2021-07-21 This edited book is focused on antioxidant compounds and their biosynthesis up regulation mechanism of action for selective bioactivity targeted role and the advancement of their bioactive potential during plant microbe interaction and other stress conditions. This book also emphasizes on the role of antioxidants in recruiting beneficial microbes in plant surroundings Antioxidants have multiple biological roles in plants especially in the signalling pathway These compounds are secondary metabolites produced besides the primary biosynthetic pathway and are associated with growth and development Besides they also have

special role to play during oxidative stress produced via abiotic stimulants or pathogen attack This understanding of the biosynthesis signaling and function of antioxidant compounds in plants during stress condition is helpful in restoring plant ecosystem productivity and improve plant responses to a wide range of stress conditions. This book is a useful compilation for researchers and academicians in botany plant physiology plant biochemistry and stress physiology Also the book serves as reading material for undergraduate and graduate students of environmental sciences agricultural sciences and other plant Advanced Studies in the 21st Century Animal Nutrition, 2021-12-08 The world's population is growing rapidly and consequently there is an increasing demand for high quality and safe food At the same time agricultural areas are diminishing due to industrialization among other factors Therefore the efficiency of animal production needs to be improved This book examines animal nutrition and ways to improve it Topics covered include the use of feed additives in poultry nutrition silage in dairy cattle nutrition plant origin feed additives in water buffalo nutrition microbial inoculation in dairy cow nutrition and more Handbook of Herbs and Spices K. V. Peter, 2012-09-21 Herbs and spices are among the most versatile ingredients in food processing and alongside their sustained popularity as flavourants and colourants they are increasingly being used for their natural preservative and potential health promoting properties. An authoritative new edition in two volumes Handbook of herbs and spices provides a comprehensive guide to the properties production and application of a wide variety of commercially significant herbs and spices Volume 2 begins with a discussion of such issues as the medicinal uses of herbs and spices and their sustainable production Herbs and spices as natural antimicrobials in foods and the effect of their natural antioxidants on the shelf life of food are explored before the book goes on to look in depth at individual herbs and spices ranging from ajowan to tamarind Each chapter provides detailed coverage of a single herb or spice and begins by considering origins chemical composition and classification The cultivation production and processing of the specific herb or spice is then discussed in detail followed by analysis of the main uses functional properties and toxicity With its distinguished editor and international team of expert contributors the two volumes of the new edition of Handbook of herbs and spices are an essential reference for manufacturers using herbs and spices in their products They also provide valuable information for nutritionists and academic researchers Provides a comprehensive guide to the properties production and application of a wide variety of commercially significant herbs and spices Begins with a discussion of such issues as the medicinal uses of herbs and spices and their sustainable production Explores herbs and spices as natural antimicrobials in foods and the effect of their natural antioxidants on the shelf life of food Anti-Angiogenic Functional and Medicinal Foods Jack N. Losso, Fereidoon Shahidi, Debasis Bagchi, 2007-04-05 The ability to regulate and manipulate the generation or remodeling of blood vessels is key to the successful treatment of many chronic diseases both oncological and non oncological Several bioactive compounds present in human diets are now known to exert an inhibitive effect on the either the signaling or construction of new blood vessels The i **Antidiabetic Medicinal Plants and Herbal Treatments** Azamal

Husen, 2023-07-17 Diabetes is a chronic condition associated with metabolic disorder Persons suffering from diabetes have shown accelerated levels of blood sugar which often harms the heart blood vessels eyes kidneys and nerves Over the past few decades the prevalence of diabetes has been progressively increasing Synthetic drugs are used to treat diabetic patients to help control the disorder but it is shown that numerous medicinal plants and herbal drugs are widely used in several traditional systems of medicine to prevent and treat diabetes. They are reported to produce beneficial effects in combating diabetes and alleviating diabetes related complications. These plants contain phytonutrients and phytoconstituents demonstrating protective or disease preventive properties In many developing countries herbal drugs are recommended by traditional practitioners for diabetes treatment because the use of synthetic drugs is not affordable Key Features Provides botanical descriptions distribution and pharmacological investigations of notable medicinal and herbal plants used to prevent or treat diabetes Discusses phytochemical and polyherbal formulations for the management of diabetes and other related complications Contains reports on antidiabetic plants and their potential uses in drug discovery based on their bioactive molecules This volume in the Exploring Medicinal Plants series provides an overview of natural healing treatments in selected antidiabetic plants The book presents valuable information to scientists researchers and students working with medicinal plants or for those specializing in areas of ethnobotany natural products pharmacognosy and other areas of allied healthcare It is also useful to pharmaceutical companies industrialists and health policy makers Medicinal Spice and Condiment Crops Azamal Husen, 2024-04-22 Spices are used in small quantities to add flavor aroma color and texture in food preparation However spices and condiments have also been recognized as having medicinal value They have been used traditionally as curative and preventive agents the bioactive compounds obtained from these plants are used in herbal drug formulations in modern times Medicinal Spice and Condiment Crops provides a comprehensive overview on the medicinal properties of spices and condiments with focus on various phytochemicals derived from them KEY FEATURES Examines spices and condiments with respect to their biology diversity distribution and pharmacological values Explores the scientific validations of the therapeutic potentials of spice and condiment plant species Discusses the bioactive agents involved in alleviating symptoms of cardiovascular disease cancer diabetes ulcers skin disorders and neurodegenerative diseases Explains specific medicinal features of spice and condiment producing plant species inspiring research discovery and safe herbal drug formulation A volume in the Exploring Medicinal Plants series this book is useful for plant scientists economic botanists those who work with herbal and complementary medicine as well as people working in the pharmaceutical industry

Botany for B.Sc. Students Semester II: Entrepreneurship in Botany ($NEP\ 2020\ \square\ Jammu$) Yashpaul Singh, This textbook has been designed to meet the needs of B Sc Second Semester students of Botany for the University of Jammu under the recommended National Education Policy 2020 It comprehensively covers the paper Entrepreneurship in Botany multidisciplinary course This book introduces the students to the practices used for growing multiplying value adding and

maintaining economically important plant species It aptly covers topics like food and fodder horticulture floriculture and MAP industry which deals with essential components of human nutrition fodder crops fruits flowers and medicinal plants Each chapter is written keeping in view the style of new pattern of setting questions in the examination like short answer type questions and long answer questions Ancient and Traditional Foods, Plants, Herbs and Spices used in Diabetes Rajkumar Rajendram, Victor Preedy, Vinood Patel, 2023-09-26 The use of different foods herbs and spices to treat or prevent disease has been recorded for thousands of years Egyptian papyrus hieroglyphics and ancient texts from the Middle East have described the cultivation and preparations of herbs and botanicals to cure the sick There are even older records from China and India Some ancient scripts describe the use of medicinal plants which have never been seen within European cultures Indeed all ancient civilizations have pictorial records of different foods herbs and spices being used for medical purposes However there are fundamental issues pertaining to the scientific evidence for the use of these agents or their extracts in modern medicine These issues are explored in Ancient and Traditional Foods Plants Herbs and Spices Used in Diabetes Features Investigates alternative healthcare paradigms that use traditional dietary foods plant derived materials and extracts to treat diabetes Describes scientific studies using modern day biomedical techniques Provides information on diets specific agents extracts and resources Many chapters focus on plant derived material providing a historical background uses toxicity and cautionary notes and summary points There have been considerable advances in scientific techniques over the last few decades These have been used to examine the composition and applications of traditional cures Modern science has also seen the investigation of herbs spices and botanicals beyond their traditional usage Diabetes is one of the most common diseases worldwide with over 400 million people with the illness With chapter contributions by an international panel of contributors this book is useful for researchers in the area of functional foods Diabetologists nutritionists endocrinologists healthcare workers and pharmacologists will also find this book extremely valuable Plants as Medicine and Aromatics Mohd Kafeel Ahmad Ansari, Mushtag Ahmad, Gary Owens, 2024-10-22 Plant based medicines and aromatics are increasingly in demand in the healthcare sector all over the globe where they are used not only for the treatment of various diseases but also for maintaining good human health Plants as Medicine and Aromatics Uses of Botanicals reviews modern uses of ancient botanicals as medicine and aromatics including chapters on both traditional usage and modern drug discovery development as well as clinical research and development in ancient medicinal herbs Features Assesses the status of aromatics and medicinal plants as well as their modern uses Elucidates the uses of plants within traditional culture practices for the prevention and treatment of diseases Examines contemporary approaches being used to explore medicinal botany A volume in the Exploring Medicinal Plants series Plants as Medicine and Aromatics Uses of Botanicals presents a comprehensive understanding in terms of modern uses of botanicals of medicinal and aromatic plants It is useful to researchers teachers cultivators students and for those interested in herbal medicine Synthesis of Medicinal Agents from

Plants Ashish Tewari, Supriya Tiwari, 2018-04-17 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

Essential Oils Rajendra Chandra Padalia, Dakeshwar Kumar Verma, Charu Arora, Pramod Kumar Mahish, 2023-02-20 Essential oils are simply the volatile oils of plants These are concentrated liquids contain many terpenes alkaloids and alcohols etc Various compounds of essential oils have bioactive properties such as antimicrobial anti cancer anti diabetic anti viral and anti fungal etc This book describes the sources of essential oils extraction and production method characterizing tools bioactivity and various applications in the field of industries daily usage agriculture health and food *The Chemistry inside Spices & Herbs: Research and Development:* Volume 1 Pankaj Kumar Chaurasia, Shashi Lata Bharati, 2022-04-13 The Chemistry inside Spices Herbs Research and Development brings comprehensive information about the chemistry of spices and herbs with a focus on recent research in this field The book is an extensive 2 part collection of 20 chapters contributed by experts in phytochemistry with the aim to give the reader deep knowledge about phytochemical constituents in herbal plants and their benefits The contents include reviews on the biochemistry and biotechnology of spices and herbs herbal medicines biologically active compounds and their role in therapeutics among other topics Chapters which highlight natural drugs and their role in different diseases and special plants of clinical significance are also included Part I focuses on the general aspects of spice biotechnology structure activity relationships and the natural products that can be used to treat different diseases such as neurological diseases inflammation pain and infections This part also covers information about phenolic compounds flavonoids and turmeric supplements This book is an ideal resource for scholars in life sciences phytomedicine and natural product chemistry and general readers who want to understand the importance of herbs spices and traditional medicine in pharmaceutical and clinical research

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