A collection of current knowledge of phytochemicals and health. Interest in phenolic phytochemicals has increased as scientific studies indicate these compounds exhibit potential health benefits. With contributions from world leaders in this research area, *Plant Phenolics and Human Health: Biochemistry, Nutrition, and Pharmacology* offers an essential survey of the current knowledge on the capacity of specific micronutrients present in ordinary diets to fight disease. The coverage in this resource: Explains the presence and biochemical properties of phenolics present in fruits and vegetables, as well as in foods derived from their plant sources Provides biochemical explanations on how certain plant phenolics fight cardiovascular and neurodegenerative diseases, cancer, and other widespread pathologies Focuses on certain phenolics, e.g., flavonoids, stilbenes, and curcuminoids, and provides insights on the biochemical bases used to define their significance in the diet as well as their recommended consumption requirements and toxicity Appropriate for graduate and upper-level undergraduate courses in human and animal nutrition, basic nutritional biology, physiology, pharmacology, and other health-related disciplines, *Plant Phenolics and Human Health: Biochemistry, Nutrition, and Pharmacology* serves as both an invaluable supplementary classroom text and a self-teaching guide for professionals interested in defining the association between diet and health from classical, alternative, and complementary biomedical perspectives.
Processing and Impact on Antioxidants in Beverages presents information key to understanding how antioxidants change during production of beverages, how production options can be used to enhance antioxidant benefit, and how to determine the production process that will result in the optimum antioxidant benefit while retaining consumer acceptability. In the food industry, antioxidants are added to preserve the shelf life of foods and to prevent off-flavors from developing. These production-added components also contribute to the overall availability of essential nutrients for intake. Moreover, some production processes reduce the amount of naturally occurring antioxidants. Thus, in terms of food science, it is important to understand not only the physiological importance of antioxidants, but what they are, how much are in the different food ingredients, and how they are damaged or enhanced through the processing and packaging phases. This book specifically addresses the composition and characterization of antioxidants in coffee, green tea, soft drinks, beer, and wine. Processing techniques considered here include fermentation and aging, high-pressure homogenization, enzymatic debittering, and more. Lastly, the book considers several selective antioxidant assays, such as Oxygen Radical Absorbance Capacity (ORAC) and Trolox Equivalent Antioxidant Capacity (TEAC) assays. Provides insights into processing options for enhanced antioxidant bioavailability.
for the in situ or in-line monitoring of antioxidants to reduce industrial loss of antioxidants in beverages Proposes processing of concentrated fractions of antioxidants that can be added to foods

During last couple of decades, a great deal of research has explored what exactly plants contain (bioactives) and how these molecules may interact with human physiology at the molecular level. It is extremely important to know what happens to plant bioactives or their biological activities when processed or isolated under various reaction conditions. Huge numbers of extraction or food manufacturing methodologies are adversely affecting the quality of these phytonutrients so there is a prompt need to highlight these processes/methods and replace them with more novel, efficient, green, or eco-friendly ones. A Centum of Valuable Plant Bioactives is a comprehensive resource on the top 100 plant bioactives available. Chapters are grouped together by bioactives, with sections on carotenes, xanthophylls, terpenoids, steroids, polyphenols and more. This is an essential guide for botanists, food technologists and chemists, nutritionists and pharmacists. Highlights the top 100 plant bioactives, their biogenesis, distribution, extraction/purification, and metabolism Contains the latest advances in botanic biology, analytical chemistry and food technology Explores potential applications including food additives, digestion and health, chemoprevention and biotherapy
The Impact of Nanoscience in the Food Industry, Volume 12 in The Handbook of Food Bioengineering series, explores how nanoscience applications in food engineering offer an alternative to satisfying current food needs that cannot be fulfilled by natural products. Nanotechnology enables the development of tailored food ingredients and structures to replace products that are difficult to obtain. The book discusses how specialized nano-preservatives, sensors and food degradation and contamination detectors were developed and how they can be introduced in food products without degrading quality or properties of the final product. A valuable resource for food engineering researchers and students alike. Identifies common nanomaterials used in food preservation and food packaging. Provides industrial applications to increase food production. Describes analytical methods for assessing food safety. Identifies how nanoscience advances allow for new developments in functional foods and nutraceuticals. Discusses safety concerns, regulations and restricted use of nanomaterials in food bioengineering.

The present book Applications of Voltammetry is a collection of six chapters, organized in two sections. The first book section is dedicated to the application of mathematical methods, such as multivariate calibration coupled with voltammetric data and numeric simulation to solve quantitative electroanalytical problems. The second book section is devoted to the electron transfer kinetic studies and electroanalytical applications of the voltammetry, such as interfacial electron transfer of the haem group in human haemoglobin molecules.
Physisorbed on glass-/tin-doped indium oxide substrates, analysis of dyes and metal ions in trace concentrations and characterization of the antioxidant properties of wine and wine products, using a variety of voltammetric techniques and electrodes. The most recent trends and advances in voltammetry are professionally commented.

The book explores and exploits the synergy and boundary between biotechnology, bioprocessing and food engineering. Divided into three parts, Advances in Food Bioproducts and Bioprocessing Technologies includes contributions that deal with new developments in procedures, bioproducts, and bioprocesses that can be given quantitative expression. Its 40 chapters will describe how research results can be used in engineering design, include procedures to produce food additives and ingredients, and discuss accounts of experimental or theoretical research and recent advances in food bioproducts and bioprocessing technologies.

The field of antioxidant research has grown rapidly over the last 30 years and shows no sign of slowing down. In order to understand how antioxidants work, it is essential to understand how their activity is measured. However, antioxidant activity measurements are controversial and their value has been challenged. This book addresses a number of the controversies on antioxidant testing methods. Specifically, the book highlights the importance of context, helping the reader to
decide what methods are most appropriate for different situations, how the results can be interpreted and what information may be inferred from the data. There are a multiplicity of methods for measuring activity, with no standardized method approved for in vitro or in vivo testing. In order to select an appropriate method, a thorough knowledge of the processes associated with reduction-oxidation is essential, leading to an improved understanding and use of activity measurements and the associated data. The book presents background information, in a unique style, which is designed to assist readers to grasp the fundamentals of redox processes, as well as thermodynamics and kinetics, which are essential to later chapters. Recovery and extraction of antioxidants from diverse matrices are presented in a clear and logical fashion along with methods used to determine antioxidant activity from a mechanistic perspective. Other chapters present current methodologies used for activity testing in different sample types ranging from foods and plants, to body fluids and even to packaging, but always with a strong emphasis on the nature of the sample and the underlying chemistry of the method. A number of emerging techniques for assessing antioxidant behaviour, namely, electrochemical methods, chip technology exploiting microfluidic devices, metabolomics plus studies of gene and protein expression, are examined. Ultimately, these techniques will be involved in generation of "big data" for which an understanding of chemometrics will be essential in drawing valid conclusions. The book is written to appeal to a wide audience, but will be particularly helpful for any researchers who are attempting to make sense of the vast literature and
often conflicting messages on antioxidant activity.

The limited aqueous solubility of bioactive pharmaceutical ingredients presents a tremendous challenge in the development of new drugs. In recent years, methods have been developed to protect these sensitive bioactive compounds, namely antioxidants, with the aim of increasing the public sanitation grades. Emulsion-based systems are particularly interesting as colloidal delivery encapsulation systems, because they can easily be created from food-grade ingredients using relatively simple processing protocols. It is one of the most favorable delivery systems to increase the solubility of phytochemicals, nutraceuticals and food additives. Emulsion-based Encapsulation of Antioxidants: Design and Performance advances the field of colloid science through the investigation of the effects of formulation and process parameters that influence emulsion production. The book offers a deeper comprehension of the technological and biological aspects of the incorporation of encapsulated compounds in food matrices and explication of their activity. Chapters provide an overview of the status of emulsion-based formulations to encapsulate antioxidants, fabrication, properties, applications, and biological fate with emphasis on systems suitable for utilization within industry. Special emphasis is placed on the antioxidant activity of the carriers being the key advantage of these emulsion-based systems. The main aim of the book is to inspire and to guide fellow scientists and students in this field. Filled with illustrations, figures, case studies, practical examples, and historical
perspectives, the book can also be used as a practical handbook or graduate textbook. For industry professionals, the book presents easy-to-achieve approaches to industrial pharmaceutical production. Although free radicals perform some useful immune functions, they can also damage healthy cells through a process called oxidation. Antioxidants reduce the effect of free radicals by binding together with these harmful molecules, decreasing their destructive power. This book highlights various issues of free radical biology from the perspective of antioxidant defense mechanisms. It also provides useful information on gene modulation, radiation-generated reactive oxygen species-induced apoptosis in cancer, and environmental aspects associated with free radicals’ exposure on living systems.

Beer in Health and Disease Prevention is the single comprehensive volume needed to understand beer and beer-related science. Presenting both the concerns and problems of beer consumption as well as the emerging evidence of benefit, this book offers a balanced view of today's findings and the potential of tomorrow's research. Just as wine in moderation has been proposed to promote health, research is showing that beer - and the ingredients in beer - can have similar impact on improving health, and in some instances preventing disease. This book addresses the impact of beer and beer ingredients on cancers, cardiovascular disease, anti-oxidant benefits, and other health related concerns. It offers a
holistic view from beer brewing to the isolation of beer-related compounds. It contains self-contained chapters written by subject matter experts. This book is recommended for scientists and researchers from a variety of fields and industries from beer production to health-care professionals. Winner of the 2009 Best Drinks and Health Book in the World - Gourmand World Cookbook Awards The most comprehensive coverage of the broad range of topics related to the role of beer and beer ingredients in health Addresses the impact of beer and beer ingredients on cancers, cardiovascular disease, anti-oxidant benefits, and other health related concerns Presents a holistic view from beer brewing to the isolation of beer-related compounds Appropriate for scientists and researchers from a variety of fields and industries from beer production to health-care professionals Consistent organization of each chapter provides easy-access to key points and summaries Self-contained chapters written by subject matter experts

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

This book discusses the development of various reliable scanning electrochemical microscopy (SECM) imaging techniques for studying the distribution of biomarkers and nanomaterials in thin and thick animal samples, plant antioxidant (AO) defense systems, as well as human melanoma. The authors demonstrate that SECM could improve the diagnosis and understanding of different melanoma stages on the basis of highly resolved maps of the tyrosinase distribution. Tyrosinase is the key enzyme involved in fruit maturation and is a biomarker for melanoma. As such the book presents various tyrosinase SECM detection strategies developed for the analysis of the spatial distribution of tyrosinase in melanoma and in banana samples. It describes the first imaging of the redox active proteins within the entire mouse heart with an SECM system using a spider probe composed of eight independent microelectrodes. Further, it investigates distributions of injected graphene nanoribbons (GONRs) for drug delivery by Soft-Probe-SECM. Lastly, the book outlines a non-invasive electrochemical strategy for mapping the AO activity of apple peel using Soft-Probe-SECM.
Contains new and expanded material on antioxidants in beverages and herbal products, nitric oxide and selenium, and the effect of vitamin C on cardiovascular disease and of lipoic acid on aging, hyperglycemia, and insulin resistance! Offering over 4200 contemporary references-2000 more than the previous edition-the Second Edition of the Handbook of Antioxidants is an up-to-the-minute source for nutritionists and dietitians, cell biologists and biochemists, cardiologists, oncologists, dermatologists, and medical students in these disciplines.

Alcoholic Beverages, Volume Seven in The Science of Beverages series, is a multidisciplinary resource for anyone who needs deeper knowledge on the most recent approaches in beverage development, technology, and engineering, along with their effects on beverage composition, quality, sensory and nutritional features. The book discusses main alcoholic beverages, such as spirits and wines that are thoroughly analyzed in terms of production, sustainability, and future perspectives. It offers examples of the new trends and the most recent technologies and approaches in the industry of alcoholic drinks. Includes a variety of trending ingredients for novel beverage production Provides different approaches for the identification of adulterations and contaminants in alcoholic beverages Includes research examples and applications of different products, such as beer, wine, and spirits

Honey typically has a complex chemical and biochemical composition that
invariably includes complex sugars, specific proteins, amino acids, phenols, vitamins, and rare minerals. It is reported to be beneficial in the treatment of various diseases, such as those affecting the respiratory, cardiovascular, gastrointestinal, and nervous systems, as well as diabetes mellitus and certain types of cancers; however, there is limited literature describing the use of honey in modern medicine. This book provides evidence-based information on the pharmaceutical potential of honey along with its therapeutic applications and precise mechanisms of action. It discusses in detail the phytochemistry and pharmacological properties of honey, highlighting the economic and culturally significant medicinal uses of honey and comprehensively reviewing the scientific research on the traditional uses, chemical composition, scientific validation, and general pharmacognostical characteristics. Given its scope, it is a valuable tool for researchers and scientists interested in drug discovery and the chemistry and pharmacology of honey.

Oregano: The Genera Origanum and Lippia is an updated analysis of the technical knowledge and market information on the world's most commercially valuable spice. The book treats various aspects of practical significance for the crop's industrialization, such as optimizing germplasm selection and utilization, novel cultivation methods and product pr
In our modern society, expectations are high, also with respect to our daily diet. In addition to being merely "nutritious", i.e. supplying a variety of essential nutrients, including macro-nutrients such as proteins or micro-nutrients such as minerals and vitamins, it is almost expected that a good diet offers further advantages - especially well-being and health and the prevention of chronic diseases, which are, as we generally tend to grow older and older, becoming a burden to enjoying private life and to the entire society. These additional qualities are often sought in diets rich also in non-nutritive components, such as phytochemicals. In contrast to drugs, which are taken especially to cure or ameliorate diseases, it is expected that a healthy diet acts in particular on the side of prevention, allowing us to become old without feeling old. In the present book, rather than trying to give an exhaustive overview on nutritional aspects and their link to well-being and health, selected topics have been chosen, intended to address presently discussed key issues of nutrition for health, presenting a reasonable selection of the manifold topics around diet, well-being, and health: from the antioxidants polyphenols and carotenoids, aroma-active terpenoids, to calcium for bone health, back to traditional Chinese Medicine.

Characterization of Nanomaterials: Advances and Key Technologies discusses the latest advancements in the synthesis of various types of nanomaterials. The book's main objective is to provide a comprehensive review regarding the latest advances in synthesis protocols that includes up-to-date data records on the synthesis of all
kinds of inorganic nanostructures using various physical and chemical methods. The synthesis of all important nanomaterials, such as carbon nanostructures, Core-shell Quantum dots, Metal and metal oxide nanostructures, Nanoferrites, polymer nanostructures, nanofibers, and smart nanomaterials are discussed, making this a one-stop reference resource on research accomplishments in this area. Leading researchers from industry, academia, government and private research institutions across the globe have contributed to the book. Academics, researchers, scientists, engineers and students working in the field of polymer nanocomposites will benefit from its solutions for material problems. Provides an up-to-date data record on the synthesis of all kinds of organic and inorganic nanostructures using various physical and chemical methods Presents the latest advances in synthesis protocols Presents latest techniques used in the physical and chemical characterization of nanomaterials Covers characterization of all the important materials groups such as: carbon nanostructures, core-shell quantum dots, metal and metal oxide nanostructures, nanoferrites, polymer nanostructures and nanofibers A broad range of applications is covered including the performance of batteries, solar cells, water filtration, catalysts, electronics, drug delivery, tissue engineering, food packaging, sensors and fuel cells Leading researchers from industry, academia, government and private research institutes have contributed to the books

Antioxidants are one of the most sought-after biological compounds of interest to
both scientific and nonscientific communities. The term gained popularity with the advent of identifying these compounds as having the ability to maintain health and wellness by combating against pathways leading to non-communicable diseases. This book covers several aspects of antioxidants—mechanisms of action, assays of measuring potency, sources, and even methods of isolation and identification. While it may seem these aspects have been covered in depth in several publications before this, this book intends to be positioned as an update, especially since the area of antioxidant research is as dynamic as ever. There are several chapters that might be of interest to health buffs, specifically those who are quite keen on maintaining health and wellness.

With more than 40 contributions from expert authors, this is an extensive overview of all important research topics in the field of bioengineering, including metabolic engineering, biotransformations and biomedical applications. Alongside several chapters dealing with biotransformations and biocatalysis, a whole section is devoted to biofuels and the utilization of biomass. Current perspectives on synthetic biology and metabolic engineering approaches are presented, involving such example organisms as Escherichia coli and Corynebacterium glutamicum, while a further section covers topics in biomedical engineering including drug delivery systems and biopharmaceuticals. The book concludes with chapters on computer-aided bioprocess engineering and systems biology. This is a part of the Advanced Biotechnology book series, covering all pertinent aspects of the field
with each volume prepared by eminent scientists who are experts on the topic in question. Invaluable reading for biotechnologists and bioengineers, as well as those working in the chemical and pharmaceutical industries.

Fruit ripening is an important aspect of fruit production. The timing of it affects supply chains and buying behaviour, and for consumers ripeness not only affects perceptions of health but has nutritional effects too. Ripeness is closely related to spoilage which has a major financial impact on agricultural industries. Currently there are fast moving developments in knowledge of the factors affecting fruit ripeness, and this up-to-date monograph seeks to draw together the disparate research in this area. The aim of the book is to produce a comprehensive account covering almost every area related to fruit ripening including the latest molecular mechanisms regulating fruit ripening, its impact on human nutrition and emerging research and technologies.

World-wide there are more overweight and obese people (1 billion) than there are malnourished (0.8 billion). Today the challenge lies not just in meeting basic nutritional needs, but providing additional protective ingredients to help prevent the major chronic diseases associated with obesity. Biotechnology has become an important tool in recent ye
This book presents the latest research on plant phenolics, offering readers a detailed, yet comprehensive account of their role in sustainable agriculture. It covers a diverse range of topics, including extraction processes; the role of plant phenolics in growth and development; plant physiology; post-harvesting technologies; food preservation; environmental, biotic and abiotic stress; as well as nutrition and health. Further the book provides readers with an up-to-date review of this dynamic field and sets the direction for future research. Based on the authors’ extensive experience and written in an engaging style, this highly readable book will appeal to scholars from various disciplines. Bringing together work from leading international researchers, it is also a valuable reference resource for academics, researchers, students and teachers wanting to gain insights into the role of plant phenolics in sustainable agriculture.

Flavonoids exert a multiplicity of biological effects on humans and can have beneficial implications for numerous disease states. Flavonoids and Related Compounds: Bioavailability and Function examines current knowledge regarding the absorption, metabolism, and bioavailability of individual flavonoids and related phenolic compounds. Profiling the latest evidence of their impact on various human pathological conditions, the book summarizes current thinking with regard to the biotransformation and conjugation of individual compounds in the gastrointestinal tract, liver, large intestine, and cells. It highlights a topic that has been largely ignored—namely the extent to which dietary phenolics components
undergo metabolism in the large intestine. It also explores the generation of bacterially derived metabolites. Individual chapters discuss which metabolites enter the circulatory system and are likely to offer protective actions against human diseases. Edited by internationally recognized leaders in the field, the book presents contributions by a panel of experts who demonstrate the potential of flavonoids in ameliorating a range of disease states, including cardiovascular disease, Alzheimer’s and Parkinson’s disease and other neurodegenerative disorders, and cancer. The research presented in this volume provides a reliable starting point for further inquiry and experimentation.

Understanding the biochemistry of food is basic to all other research and development in the fields of food science, technology, and nutrition, and the past decade has seen accelerated progress in these areas. Advances in Food Biochemistry provides a unified exploration of foods from a biochemical perspective. Featuring illustrations to elucidate m

Revised and updated to reflect the latest research and advances available, Food Biotechnology, Second Edition demonstrates the effect that biotechnology has on food production and processing. It is an authoritative and exhaustive compilation that discusses the bioconversion of raw food materials to processed products, the improvement of food
Encapsulations, a volume in the Nanotechnology in the Agri-Food Industry series, presents key elements in establishing food quality through the improvement of food flavor and aroma. The major benefits of nanoencapsulation for food ingredients include improvement in bioavailability of flavor and aroma ingredients, improvement in solubility of poor water-soluble ingredients, higher ingredient retention during production process, higher activity levels of encapsulated ingredients, improved shelf life, and controlled release of flavor and aroma. This volume discusses main nanoencapsulation processes such as spray drying, melt injection, extrusion, coacervation, and emulsification. The materials used in nanoencapsulation include lipids, proteins, carbohydrates, cellulose, gums, and food grade polymers. Applications and benefits of nanoencapsulation such as controlled release, protections, and taste masking will be explained in detail. Includes the most up-to-date information on nanoencapsulation and nanocontainer-based delivery of antimicrobials Presents nanomaterials for innovation based on scientific advancements in the field Provides control release strategies to enhance bioactivity, including methods and techniques for research and innovation Provides useful tools to improve the delivery of bioactive molecules and living cells into foods

Coffee in Health and Disease Prevention presents a comprehensive look at the compounds in coffee, their reported benefits (or toxicity risks) and also explores them on a health-condition specific level, providing researchers and academics...
with a single-volume resource to help in identifying potential treatment uses. No other book on the market considers all the varieties of coffee in one volume, or takes the disease-focused approach that will assist in directing further research and studies. The book embraces a holistic approach and effectively investigates coffee and its specific compounds from the biochemical to the nutritional well-being of geographical populations. This book represents essential reading for researchers in nutrition, dietetics, food science, biochemistry, and public health. Presents one comprehensive, translational source for all aspects of how coffee plays a role in disease prevention and health Experts in nutrition, diet, and food chemistry (from all areas of academic and medical research) take readers from the bench research (cellular and biochemical mechanisms of vitamins and nutrients) to new preventive and therapeutic approaches Focuses on coffee composition; nutritional aspects of coffee; protective aspects of coffee-related compounds; specific coffee components and their effects on tissue and organ systems Features sections on both the general effects of coffee consumption on the body as well as the effects of specific coffee compounds on specific organ systems

Antioxidants in food have a dual role; on the one hand, they preserve the quality and shelf life of food products; on the other hand, they function as an external aid, helping to defend our living cells from the threat of oxidative stress. Therefore, foods rich in antioxidants are a useful tool to reduce morbidity and prevent
degenerative diseases. Consequently, research related to antioxidants is continually growing. This book brings together 21 articles regarding the latest advances in the most relevant fields of food antioxidant research; from the identification and characterization of new active components, to their molecular mechanisms and the scientific evidence of their clinical use and effectiveness.