Cereals Novel Uses And Processes 1st Edition

This book is a collection of chapters concerning the use of biomass for the sustainable production of energy and chemicals–an important goal that will help decrease the production of greenhouse gases to help mitigate global warming, provide energy security in the face of dwindling petroleum reserves, improve balance of payment problems and spur local economic development. Clearly there are ways to save energy that need to be encouraged more. These include more use of energy sources such as, among others, manure in anaerobic digesters, waste wood in forests as fuel or feedstock for cellulosic ethanol, and conservation reserve program (CRP) land crops that are presently unused in the US. The use of biofuels is not new; Rudolf Diesel used peanut oil as fuel in the ?rst engines he developed (Chap. 8), and ethanol was used in the early 1900s in the US as automobile fuel [Songstad et al. (2009) Historical perspective of biofuels: learning from the past to rediscover the future. In Vitro Cell Dev Biol Plant 45:189–192). Brazil now produces enough sugar cane ethanol to make up about 50% of its transportation fuel needs (Chap. 4). The next big thing will be cellulosic ethanol. At present, there is also the use of Miscanthus x giganteous as fuel for power plants in the UK (Chap. 2), bagasse (sugar cane waste) to power sugar cane mills (Chap. 4), and waste wood and sawdust to power sawmills (Chap. 7).
Whisky: Technology, Production and Marketing explains in technical terms the science and technology of producing whisky, combined with information from industry experts on successfully marketing the product. World experts in Scotch whisky provide detailed insight into whisky production, from the processing of raw materials to the fermentation, distillation, maturation, blending, production of co-products, and quality testing, as well as important information on the methodology used for packaging and marketing whisky in the twenty-first century. No other book covers the entire whisky process from raw material to delivery to market in such a comprehensive manner and with such a high level of technical detail. Only available work to cover the entire whisky process from raw material to delivery to the market in such a comprehensive manner Includes a chapter on marketing and selling whisky Foreword written by Alan Rutherford, former Chairman and Managing Director of United Malt and Grain Distillers Ltd.
In order to successfully compete as a sustainable energy source, the value of biomass must be maximized through the production of valuable co-products in the biorefinery. Specialty chemicals and other biobased products can be extracted from biomass prior to or after the conversion process, thus increasing the overall profitability and sustainability of the biorefinery. Biorefinery Co-Products highlights various co-products that are present in biomass prior to and after processing, describes strategies for their extraction , and presents examples of bioenergy feedstocks that contain high value products. Topics covered include: Bioactive compounds from woody biomass Phytochemicals from sugar cane, citrus waste and algae Valuable products from corn and other oil seed crops Proteins from forages Enhancing the value of existing biomass processing streams Aimed at academic researchers, professionals and specialists in the bioenergy industry, Biorefinery Co-Products is an essential text for all scientists and engineers working on the efficient separation, purification and manufacture of value-added biorefinery co-products. For more information on the Wiley Series in Renewable resources, visit www.wiley.com/go/rrs
Chemical Engineering and Chemical Process Technology is a theme component of Encyclopedia of Chemical Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty Encyclopedias. Chemical engineering is a branch of engineering, dealing with processes in which materials undergo changes in their physical or chemical state. These changes may concern size, energy content, composition and/or other application properties. Chemical engineering deals with many processes belonging to chemical industry or related industries (petrochemical, metallurgical, food, pharmaceutical, fine chemicals, coatings and colors, renewable raw materials, biotechnological, etc.), and finds application in manufacturing of such products as acids, alkalis, salts, fuels, fertilizers, crop protection agents, ceramics, glass, paper, colors, dyestuffs, plastics, cosmetics, vitamins and many others. It also plays significant role in environmental protection, biotechnology, nanotechnology, energy production and sustainable economical development. The Theme on Chemical Engineering and Chemical Process Technology deals, in five volumes and covers several topics such as: Fundamentals of Chemical Engineering; Unit Operations – Fluids; Unit Operations – Solids; Chemical Reaction Engineering; Process Development, Modeling, Optimization and Control; Process Management; The Future of Chemical Engineering; Chemical Engineering Education; Main Products, which are then expanded into multiple subtopics, each as a chapter. These five volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.
Food and Industrial Bioproducts and Bioprocessing describes the engineering aspects of bioprocessing, including advanced food processing techniques and bioproduct development. The main focus of the book is on food applications, while numerous industrial applications are highlighted as well. The editors and authors, all experts in various bioprocessing fields, cover the latest developments in the industry and provide perspective on new and potential products and processes. Challenges and opportunities facing the bioproduct manufacturing industry are also discussed. Coverage is far-reaching and includes: current and future biomass sources and bioprocesses; oilseed processing and refining; starch and protein processing; non-thermal food processing; fermentation; extraction techniques; enzymatic conversions; nanotechnology; microencapsulation and emulsion techniques; bioproducts from fungi and algae; biopolymers; and biodegradable/edible packaging. Researchers and product developers in food science, agriculture, engineering, bioprocessing and bioproduct development will find Food and Industrial Bioproducts and Bioprocessing an invaluable resource.
Interest in cereals and other healthy grains has increased considerably in recent years, driving the cereal processing industry to develop new processing technologies that meet consumer demands for sustainable and nutritious cereal

products. Innovative Processing Technologies for Healthy Grains is the first dedicated reference to focus on advances in cereal processing and bio-refinery of cereals and pseudocereals, presenting a broad overview of all aspects of both conventional and novel processing techniques and methods. Featuring contributions from leading researchers and academics, this unique volume examines the selection and characteristics of raw ingredients, new and emerging processing technologies, novel cereal-based products, and global trends in cereal and pseudocereal use, processing and consumption. The text offers balanced coverage of advances in both the development and processing of cereal and pseudocereal products, exploring topics including gluten-free products, cereal-based animal feed, health and wellness trends in healthy grain consumption, bioaccessibility and bioavailability of nutritional compounds, gluten-free products, and the environmental impact of processed healthy grains. This timely and comprehensive volume: Focuses on innovative cereal processing and bio-refinery of cereals and pseudocereals Provides informed perspectives on the current global trends in cereal and pseudocereal use, processing and consumption Describes the characteristics of healthy grains and their production, nutritional value, and utilization Explains the origin, production, processing, and functional ingredients of pseudocereals Reviews healthy grain products such as cereal-based beverages, fortified grain-based products, and cereal-based products with bioactive benefits Part of Wiley's IFST Advances in Food Science series Innovative Processing Technologies for Healthy Grains is an essential resource for food scientists, technologists, researchers, and other professionals working in the grain indus

Edited by a renowned seed biologist with a team assembled from the most respected laboratories worldwide, Seed Technology and Its Biological Basis illustrates the commercial value of seeds as a major resource. The editors provide a sweeping overview of the current state-of-the-art in seed technology and its biological basis. The book is invaluable to researchers and professionals in both the industrial and academic sectors.

Cereals processing is one of the oldest and most important of all food technologies. Written by a distinguished international team of contributors, Cereals Processing Technology reviews the range of cereal products and technologies used to produce them. It is designed for all those involved in cereals processing, whether raw material producers and refiners needing to match the needs of secondary processors benchmarking their operations against the best prices in their sector and across cereals processing as a whole. Part 1 looks at cereal and flour production, with chapters on cereal and production methods and flour milling. There is also a chapter on the increasingly important and controversial area of cereal biotechnology and its application to wheat, barley, rice, and maize. Part 2 looks at how these raw materials are then processed into final products for the consumer. There are chapters on rice and rice product production, pasta and Asian noodle processing, the manufacture of breakfast cereals, malting, and breadmaking. Chapters look at the increasing diversity of cereal products, at current best practice in manufacturing processes, and emerging trends in the technologies for particular products. Cereals Processing Technology provides an authoritative guide to some of the key technological developments both within particular sectors and across cereals processing as a whole.

There is little doubt that today’s food industry is faced with a rapidly changing market landscape. The obvious need to continue to provide consumers with nutritious, delectable, safe, and affordable food products which are also profitable for food manufacturers, as well as the ongoing challenge of ensuring the delivery of adequate nutrition to hundreds of millions of disadvantaged people around the world, appears – at least as much as, if not more than, ever – to be at odds with the challenges posed by soaring energy and food commodity prices; fast-paced changes in consumer demographics, habits, and preferences; and the continual need to stay ahead of current and emerging food safety issues. In addition to this, the present ubiquity in the industry of terms such as functional foods, nutraceuticals, low sodium, low fat, clean label, minimal processing, and natural – to name a few – underscores yet a different dimension of the challenges faced by food processors today. On the other hand, however, the solutions of many of these challenges may, concurrently, present the food industry with unique and exciting opportunities. The processed meat industry, despite its long history and tradition, is certainly not exempt from having to face these modern challenges, nor excluded from realizing the promises of the opportunities that may lie ahead.

"So long as a person is capable of self renewal they are a living being. " -Amiel Cereals have been the source of life to the human race, providing nutritional and ma terial needs since the dawn of civilization. As with all dynamic industries, the Cereal in dustry has renewed itself in the past; as the millennium approaches, it is on the brink of another renewal, in which the versatility and providence of cereals are being rediscovered, but in new and exciting ways. Cereals are richly diverse; over 10,000 varieties convert minerals and the energy of the sun into a bursting catalog of functional and versatile biomolecules and biopolymers. Processing technology allows these components to be accessed, separated, isolated and purified, while chemical science allows modification for even greater diversity and speci ficity. The last century has seen the move from cereal- to oil-based chemical and materials industries. But cereals contain a greater variety and functionality of macromolecules than oil. Starch, protein, bran and straw, already diverse across cereal varieties, can be fraction ated into more specific elements, modified chemically to enhance function, or used as feedstocks in fermentation-based bioconversion systems, to produce a range of bulk and fine chemicals for industries as diverse as food, pharmaceuticals, plastics, textiles, pulp and paper, transport, composites and boards, adhesives and energy.

Sustainable Recovery and Reutilization of Cereal Processing By-Products addresses topics associated with the sustainable management of cereal manufacturing. Emphasis is placed on current, advisable practices, general valorization techniques of cereal processing by-products, and the functional properties of healthy cereal by-product components that lead to target applications in foods and nutraceuticals. Focus includes discussions on wheat bran, distillers' dried grains—based within the biorefinery concept, and different techniques for the separation, extraction, recovery and formulation of valuable compounds, including proteins, arabinoxylans, and beta-glucan. Addresses topics associated with the sustainable management of cereal manufacturing Places emphasis on current, advisable practices Presents general valorization techniques of cereal processing by-products Highlights the functional properties of healthy cereal by-product components that lead to target applications in foods and nutraceuticals

This book explains how the use of whole plants and by-products can maximize efficiency in the European oil-crop supply chain.

Millets and Pseudo Cereals is the first comprehensive resource to focus on the potential crop improvements through genetic enhancements. The choice of food crop for a region is primarily determined by the conditions of climate and soil. Once labelled as orphan crops, millets and pseudo-cereals are now known as miracle grains due to their adaptation to harsh conditions and high nutritional quality. Small millets and pseudo-cereals are now seen to occupy special niches through their ability to adapt to challenging conditions. These crops have a comparative advantage in marginal lands where they withstand stress conditions and contribute to sustainable production. They also contribute to the diversity-richness and production stability of agro-ecosystems. Millets include sorghum, pearl millet, finger millet, foxtail

millet, proso millet, barnyard millet, little millet and kodo millet while the other group which are not cereals but consumed as cereals and generally referred as pseudo-cereals comprises of grain amaranths, buckwheat and chenopods. Millets and Pseudo Cereals presents current information on the genetic architecture of important economic traits and the genomic resources for gene enabled breeding. This compilation contains information on the global status, available germplasm resources, nutritional value, breeding advancements, genomics applications and sustainability of agriculture through millets and pseudo-cereals cultivation. This book is a valuable resource for those conducting research and exploring new areas for advancing crop genetic understanding. Explores the current challenges of pseudo-cereal production and how that can be overcome by developing genetic and breeding resources using appropriate germplasm Provides holistic information on millets and pseudo-cereals Features global perspectives from an international contributing team of authors

There are 71 chapters in the book and authors from Australia, Brazil, Canada, China, Hong Kong, Japan, Mexico, Taiwan and the United States. The chapters are arranged under seven sections, which include General Topics in Food Science and Technology; Food Processing and Engineering; Antioxidants in Foods; Nutrition and Food Science; Food Safety; Sensory Science of Foods; and Food Biotechnology. Many of the chapters are exceptional in the quality and depth of science and state-of-the-art instrumentation and techniques used in the experimentation. There is literally a gold mine of new information available in this book, not only for healthful foods for the Pacific Rim but for many other areas as well.

This book defines the processes used for delivering a range of food items to the city of Rome and its hinterland from the first century AD using modern supply chain modelling techniques. The subject matter delves into the wider supply of goods, such as wood and building products, to add further perspective to the breadth of the system managed by the Roman administration to ensure supply and political stability. It assesses the impact of strategic changes such as the introduction of water-powered milling technology and restructuring of the annona in this period, as well as administrative reforms. Evidence from ancient sources, both literary and epigraphic, along with relevant archaeological comparative evidence is used to develop a detailed supply model, including the mapping of warehouse management systems; port and river traffic co-ordination; quality control mechanisms and administrative structures. Unlike other contemporary studies, this model takes into consideration supply chain losses to correct the erroneous assumption that supply is equal to consumption. A product flow map from the source of supply to the consumer details the labour, equipment and infrastructure required at each stage, painting a graphic picture of just what an achievement it was for the administration to have maintained such a complex system over this long time period. Food Provisions for Ancient Rome provides an in depth exploration of this topic that will be of interest to anyone working on the city of Rome under the empire, as well as those interested in imperial administration and logistics.

No further information has been provided for this title.--

This is the first scholarly reference work to cover all the major scientific themes and facets of the subject of seeds. It outlines the latest fundamental biological knowledge about seeds, together with the principles of agricultural seed processing, storage and sowing, the food and industrial uses of seeds, and the roles of seeds in history, economies and cultures. With contributions from 110 expert authors worldwide, the editors have created 560 authoritative articles, illustrated with plentiful tables, figures, black-and-white and color photographs, suggested further reading matter and 670 supplementary definitions. The contents are alphabetically arranged and cross-referenced to connect related entries.

Particle breakage is an important process within a wide range of solids processing industries, including pharmaceuticals, food, agricultural and mining. Breakage of particles can be defined as intentional and unintentional, depending on whether it is desired or not. Through understanding of the science and underlying mechanisms behind this phenomenon, particle breakage can be either minimised or encouraged within an efficient and effective process. Particle Breakage examines particle breakage at three different length scales, ranging from single particle studies through groups of particles and looking at solid processing steps as a whole. This book is the widest ranging book in the field and includes the most up-to-date techniques such as Distinct Element Method (DEM), Monte Carlo simulations and Population Balance Equations (PBE). This handbook provides an overview of the current state-of-the- art and particle breakage. From the small scale of a single particle, to the study of whole processes for breakage; both by experimental study and mathematical modelling. * Covering a wide range of subjects and industrial applications * Allows the reader an understanding of the science behind engineered breakage processes * Giving an unrestrictive and interdisciplinary approach

Agriculture depends on improved cultivars, and cultivars are developed through proper plant breeding. Unfortunately, applied plant breeding programs that are focused on cereal commodity crops are under serious erosion because of lack of funding. This loss of public support affects breeding continuity, objectivity, and, perhaps equally important, the training of future plant breeders and the utilization and improvement of plant genetic resources currently available. Breeding programs should focus not only on short-term research goals but also on long-term genetic improvement of germplasm. The research products of breeding programs are important not only for food security but also for commodity-oriented public and private programs, especially in the fringes of crop production. Breeding strategies used for long-term selection are often neglected but the reality is that long-term research is needed for the success of short-term products. An excellent example is that genetically broad-based public germplasm has significantly been utilized and recycled by industry, producing billions of dollars for industry and farmers before intellectual property rights were available. Successful examples of breeding continuity have served the sustainable cereal crop production that we currently have. The fact that farmers rely on public and private breeding institutions for solving long-term challenges should influence policy makers to reverse this trend of reduced funding. Joint cooperation between industry and public institutions would be a good example to follow. The objective of this volume is to increase the utilization of useful genetic resources and increase awareness of the relative value and impact of plant breeding and biotechnology. That should lead to a more sustainable crop production and ultimately food security. Applied plant breeding will continue to be the foundation to which molecular markers are applied. Focusing useful molecular techniques on the right traits will build a strong linkage between genomics and plant breeding and lead to new and better cultivars. Therefore, more than ever there is a need for better communication and cooperation among scientists in the plant breeding and biotechnology areas. We have an opportunity to greatly enhance agricultural production by applying the results of this research to meet the growing demands for food security and environmental conservation. Ensuring strong applied plant breeding programs with successful application of molecular markers will be essential in ensuring such sustainable use of plant genetic resources.

...an ideal information source for those involved in managing waste and recovering waste for use in products to produce revenue... (Food Science and Technology - review of Volume 1) This is a most welcome addition to the literature, likely to be essential study material for both technologists and process engineers. (The Chemical Engineer - review of Volume 1) Food processors are under pressure, both from consumers and legislation, to reduce the amount of waste they produce and to consume water and energy more efficiently. Handbook of waste management and co-product recovery in food processing provides essential information about the major issues and technologies involved in waste co-product valorisation, methods to reduce water and energy consumption, waste reduction in particular food industry sectors and end waste management. Opening chapters in Part one of Volume 2 cover economic and legislative drivers for waste management and co-product recovery. Part two discusses life cycle analysis and closed-loop production systems to minimise environmental impacts in food production. It also includes chapters on water and energy use as well as sustainable packaging. Part three reviews methods for exploiting co-products as food and feed ingredients, whilst the final part of the book discusses techniques for non-food exploitation of co-products from food processing. Provides essential information about the major issues and technologies involved in waste product valorisation

Examines methods to reduce water and energy consumption in partciular food industry sectors Discusses the economic and legislative drivers for waste management and co-product recovery

Biomass to Renewable Energy Processes, Second Edition, explains the theories of biological processes, biomass materials and logistics, and conversion technologies for bioenergy products such as biogas, ethanol, butanol, biodiesel, and synthetic gases. The book discusses anaerobic digestion of waste materials for biogas and hydrogen production, bioethanol and biobutanol production from starch and cellulose, and biodiesel production from plant oils. It addresses thermal processes, including gasification and pyrolysis of agricultural residues and woody biomass. The text also covers pretreatment technologies, enzymatic reactions, fermentation, and microbiological metabolisms and pathways.

Whisky and Other Spirits: Technology, Production and Marketing, Third Edition continues to provide details from raw materials to the finished product, including production, packaging and marketing. It focuses on the science and technology of the process as well as the environment in which it is produced. Today, environmental concerns and sustainability of products has taken on a new level of importance. Traditional ways of packaging and marketing have also changed dramatically in recent years as the technology of packaging has moved from a staid bottle industry to spirit products that cross traditional beverage categories and packaging. This new edition provides the latest changes in industry and the beverages market. All chapters are updated, with new chapters added to help improve research and development, and to increase production of not only whiskey but other spirits such as gin and rum and white spirits. This new edition also discusses trendy reduced alcohol and no alcohol products. Presents a detailed look into current global situation for whisky and spirits production Highlights craft distilling and the challenges craft distillers face by presenting the art of spirit production in clear detail Presents insights into how marketing has changed for distilled products, with an emphasis on new mobile technologies

Microbial Biotechnology: An Interdisciplinary Approach covers all aspects of microbial biotechnology, whilst bringing the field of functional foods and microbial bioremediation to the fore. Recounting the interdisciplinary scope of biotechnology and its discoveries, this text presents innovative ideas in the field of emerging biotechnology providing the scientific community with a much needed new resource. Acting as an important means of information for researchers working in interdisciplinary areas of research, this text: Envisages the recent ideas of novel findings in microbiology Provides insight into the various interdisciplinary research avenues Uniquely covers a diverse range of topics Presents groundbreaking new findings in key areas of modern biotechnology Enhanced and straight forward descriptions cater to the needs of researchers working in areas of bacterial exopolysaccharides, microalgal proteomics, applications of Microbial L-asparaginases, novel aspects of bioremediation, Probiotics and their impact on society, and microbial community analysis in waste water treatment techniques. It will also prove crucial reading for senior undergraduate and graduate students and professionals working in areas of modern biotechnology.

Cereal Grains: Assessing and Managing Quality, Second Edition, provides a timely update to this key reference work. Thoroughly revised from the first edition, this volume examines the latest research and advances in the field. New chapters have been added on alternative grains, including ancient grains and pseudocereals, biosecurity, and industrial processing of grains, amongst others. Quality and food safety are important throughout the value-addition chain, from breeding, production, harvest, storage, transport, processing, and marketing. At all stages, analysis is needed so that quality management can proceed intelligently. These considerations are examined for each of the major cereal species, including wheat (common and durum), rye and triticale, barley and oats, rice, maize (corn), pseudocereal species, sorghum, and the millets. Divided into five sections, the book analyses these for the range of cereal species before a final section summarizes key findings. Documents the latest research in cereal grains, from their nutraceutical and antioxidant traits, to novel detection methods Provides a complete and thorough update to the first edition, analyzing the range of major cereal species Presents detailed advice on the management of cereal quality at each stage of production and processing

Maize is a globally important crop mainly utilized as feed, food and raw material for diverse industrial applications. Among cereals, it occupies third place after rice and wheat and is a staple food for a large segment of population worldwide particularly in the Asian as well as African countries. This monogram discusses various aspects of nutritional quality of maize such as quality protein maize which has been considered as most significant discovery in enhancing nutritional quality of cereals in terms of increasing the concentration of essential amino acids. The biochemistry of starch which is an important industrial product of maize has been discussed in detail. Further, the role of maize oil which is highly regarded for human consumption as it reduces the blood cholesterol concentration has also been elaborated. Naturally, maize is a rich source of carotenoids such as beta-carotene, zeaxanthin, lutein, cryptoxanthin which have highly diverse health benefits ranging from maintaining normal vision to lowering of oxidative stress. The need for biofortification of maize for provitamin A carotenoids and their role in alleviating vision impairments have also been discussed. The effect of various biotic and abiotic stresses particularly carbon dioxide and temperature on quality has been discussed thoroughly. Many value-added products as well as fermented foods that have been produced from maize which is consumed in different forms worldwide are also discussed. The aspects related to the maize application as fodder and as a source of malting have also been covered concisely. Overall, the book provides complete information about various quality aspects of maize. The various stakeholders such as maize researchers, extension specialists, students, teachers as well as farmers will be immensely benefitted from this monogram.

The Encyclopedia of Food Grains is an in-depth and authoritative reference covering all areas of grain science. Coverage includes everything from the genetics of grains to the commercial, economic and social aspects of this important food source. Also covered are the biology and chemistry of grains, the applied aspects of grain production and the processing of grains into various food and beverage products. With the paramount role of cereals as a global food source, this Encyclopedia is sure to become the standard reference work in the field of science. Also available online via ScienceDirect – featuring extensive browsing, searching, and internal cross-referencing between articles in the work, plus dynamic linking to journal articles and abstract databases, making navigation flexible and easy. For more information, pricing options and availability visit www.info.sciencedirect.com. Written from an international perspective the Encyclopedia concentrates on the food uses of grains, but details are also provided about the wider roles of grains Well organized and accessible, it is the ideal resource for students, researchers and professionals seeking an authoritative overview on any particular aspect of grain science This second edition has four print volumes which provides over 200 articles on food grains Includes extensive cross-referencing and "Further Reading" lists at the end of each article for deeper exploration into the topic This edition also includes useful items for students and teachers alike, with Topic Highlights, Learning objectives, Exercises for Revision and exercises to explore the topic further

This collection of texts written by well-recognised specialists was constituted having in view these important directions of

actual research. Sustainable economical growth requires safe resources of raw materials for the industrial production. Today's most frequently used industrial raw material, petroleum, is neither sustainable, because limited, nor environmentally friendly. While the economy of energy can be based on various alter-native raw materials, such as wind, sun, water, biomass, as well as nuclear fission and fusion, the economy of substances is fundamentally depending on biomass, in particular biomass of plants. In the last decades because of the crude oil and other natural resources crisis, a new alternative has been proposed consisting in utilisation of renewable natural resources as feedstock and fuel, among which the biomass is the most promising.

Given the environmental concerns and declining availability of fossil fuels, as well as the growing population worldwide, it is essential to move toward a sustainable bioenergy-based economy. However, it is also imperative to address sustainability in the bioenergy industry in order to avoid depleting necessary biomass resources. Sustainable Bioenergy Production provides comprehensive knowledge and skills for the analysis and design of sustainable biomass production, bioenergy processing, and biorefinery systems for professionals in the bioenergy field. Focusing on topics vital to the sustainability of the bioenergy industry, this book is divided into four sections: Fundamentals of Engineering Analysis and Design of Bioenergy Production Systems, Sustainable Biomass Production and Supply Logistics, Sustainable Bioenergy Processing, and Sustainable Biorefinery Systems. Section I covers the fundamentals of genetic engineering, novel breeding, and cropping technologies applied in the development of energy crops. It discusses modern computational tools used in the design and analysis of bioenergy production systems and the life-cycle assessment for evaluating the environmental sustainability of biomass production and bioenergy processing technologies. Section II focuses on the technical and economic feasibility and environmental sustainability of various biomass feedstocks and emerging technologies to improve feedstock sustainability. Section III addresses the technical and economic feasibility and environmental sustainability of different bioenergy processing technologies and emerging technologies to improve the sustainability of each bioenergy process. Section IV discusses the design and analysis of biorefineries and different biorefinery systems, including lignocellulosic feedstock, whole-crop, and green biorefinery.

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Sugarcane has garnered much interest for its potential as a viable renewable energy crop. While the use of sugar juice for ethanol production has been in practice for years, a new focus on using the fibrous co-product known as bagasse for producing renewable fuels and bio-based chemicals is growing in interest. The success of these efforts, and the development of new varieties of energy canes, could greatly increase the use of sugarcane and sugarcane biomass for fuels while enhancing industry sustainability and competitiveness. Sugarcane-Based Biofuels and Bioproducts examines the development of a suite of established and developing biofuels and other renewable products derived from sugarcane and sugarcane-based co-products, such as bagasse. Chapters provide broad-ranging coverage of sugarcane biology, biotechnological advances, and breakthroughs in production and processing techniques. This text brings together essential information regarding the development and utilization of new fuels and bioproducts derived from sugarcane. Authored by experts in the field, Sugarcane-Based Biofuels and Bioproducts is an invaluable resource for researchers studying biofuels, sugarcane, and plant biotechnology as well as sugar and biofuels industry personnel.

Biorefineries are an essential technology in converting biomass into biofuels or other useful materials. Advances in Biorefineries provides a comprehensive overview of biorefining processing techniques and technologies, and the biofuels and other materials produced. Part one focuses on methods of optimizing the biorefining process and assessing its environmental and economic impact. It also looks at current and developing technologies for producing value-added materials. Part two goes on to explore these materials with a focus on biofuels and other value-added products. It considers the properties, limitations, and practical applications of these products and how they can be used to meet the increasing demand for renewable and sustainable fuels as an alternative to fossil fuels. Advances in Biorefineries is a vital reference for biorefinery/process engineers, industrial biochemists/chemists, biomass/waste scientists and researchers and academics in the field. A comprehensive and systematic reference on the advanced biomass recovery and conversion processes used in biorefineries Reviews developments in biorefining processes Discusses the wide range of value-added products from biorefineries, from biofuel to biolubricants and bioadhesives

The most extensive and comprehensive reference on durum wheat chemistry and technology ever available, this ambitious update to the first edition covers more diverse and interesting topics in a new expanded format. Forty-six contributors, each highly experienced and recognized as world authorities on durum wheat, provide the latest developments in scientific research and technology. All aspects of durum wheat are covered, from agronomy and the chemical composition of the grain, to the latest industrial approaches to processing durum wheat, as well as food safety and quality assurance issues. Expanded to include new topics like functional pasta, grain safety, and biotechnology, along with practical and applied information including a table of uses for specific carbohydrates, descriptions of improved laboratory techniques, and international comparisons of HACCP experiences, Durum Wheat: Chemistry and Technology, Second Edition is a must-have reference for professionals, students, and researchers inside and outside the field who want to learn about durum wheat technology and chemistry. New and Revised Topics Include: Agronomy of durum wheat production Pasta made from non-traditional raw materials: technological and nutritional aspects Grain safety assurance, including impacts on durum wheat trading Origin and distribution of durum wheat genetic diversity in the world Genetics and breeding of durum wheat Insect and mite pests and diseases of durum wheat Kernel components of technological value Vitamins, minerals, and nutritional value of durum wheat Durum wheat milling Manufacture of pasta products Other traditional durum derived products Methods used to assess and predict quality of durum wheat, semolina, and pasta Grading factors impacting on durum wheat and processing quality Grain safety assurance including impacts on durum wheat trading Marketing perspectives in the durum wheat trade Special Features: Detailed figures outlining the

processes used to manufacture durum products International comparisons of HACCP experiences Table of uses for specific carbohydrates Descriptions of improved laboratory techniques Extensive bibliography An Essential Reference For: Scientists and researchers in agriculture and plant biology Professionals in the food industry who are processing durum wheat (millers, pasta makers, grain handling companies, and grain buyers) Government regulators Food scientists and technologists developing products using durum wheat Plant breeders University lecturers in agricultural science and plant biology Professionals who market wheat Nutritionists and medical practitioners interested in the impacts of food ingredients on human health Students Scientific libraries and their patrons

Platform Chemical Biorefinery: Future Green Chemistry provides information on three different aspects of platform chemical biorefinery. The book first presents a basic introduction to the industry beneficial for university students, then provides engineering details of existing or potential platform chemical biorefinery processes helpful to technical staff of biorefineries. Finally, the book presents a critical review of the entire platform chemical biorefinery process, including extensive global biorefinery practices and their potential environmental and market-related consequences. Platform chemicals are building blocks of different valuable chemicals. The book evaluates the possibility of renewable feedstock-based platform chemical production and the fundamental challenges associated with this objective. Thus, the book is a useful reference for both academic readers and industry technical workers. The book guides the research community working in the field of platform chemical biorefinery to develop new pathways and technologies in combination with their market value and desirability. Offers comprehensive coverage of platform chemicals biorefineries, recent advances and technology developments, potential issues for preventing commercialization, and solutions Discusses existing technologies for platform chemicals production, highlighting benefits as well their possible adverse effects on the environment and food security Includes a global market analysis of platform chemicals and outlines industry opportunities Serves as a useful reference for both academic readers and industry technical workers

An instructive and comprehensive overview of the use of biotechnology in agriculture and food production, Biotechnology in Agriculture and Food Processing: Opportunities and Challenges discusses how biotechnology can improve the quality and productivity of agriculture and food products. It includes current topics such as GM foods, enzymes, and prod

The chemical industry processes a high proportion of its products in powder form, thus making the efficient, effective and safe handling and processing of powders of prime importance. Powders and Solids: Developments in Handling and Processing Technologies brings the reader right up-to-date with both newly-introduced commercial practices and results of recent fundamental research on the behaviour of model powders. Case studies are also included. Commencing with an overview of developments in the health and safety aspects of handling powders, the book then goes on to look at the new technologies being applied to powders and powder handling, followed by aspects of measurement and control in powder handling. It will be essential reading for all industrial practitioners, particularly those in the pharmaceutical industry, as well as all engineers working either in industry or research on processes involving solid and powder handling.

Trends in Nonalcoholic Beverages covers the most recent advances, production issues and nutritional and other effects of different nonalcoholic beverages, such as carbonated beverages, cereal-based beverages, energy drinks, fruit punches, non-dairy milk products, nonalcoholic beer, ready-to-drink products (e.g. tea, coffee), smoothies, sparkling and reduced water beverages. In addition, it covers relevant issues, such as traditional non-alcoholic beverages, labeling and safety issues during production, as well as the intake of functional compounds in particular applications. This is an essential resource for food scientists, technologists, engineers, nutritionists and chemists as well as professionals working in the food/beverage industry. Provides nutrient profiles and the effects of non-alcoholic beverages Presents the relevance of the HACCP system for the non-alcoholic beverage industry Covers a broad range of different non-alcoholic beverages that exist in the market and their characteristics with regard to personalized nutrition

The third edition of this long-serving successful reference work is a 'must-have' reference for anyone needing or desiring an understanding of the structure, chemistry, properties, production and uses of starches and their derivatives. * Includes specific information on corn, wheat, potato, rice, and new chapters on rye, oat and barley (including waxy barley) starches * Covers the isolation processes, properties, functionalities, and uses of the most commonly used starches. * Explores the genetics, biochemistry, and physical structure of starches * Presents current and emerging application trends for starch

The Proceedings of the 12th International Cereal and Bread Congress provide a wide-ranging, comprehensive and up-to-date review of the latest advances in cereal science and technology with contributions from leading cereals institutes and individuals from around the world. They bring together all elements of the ‘grain chain’ from breeding of new wheat varieties through the milling processes and on to the conversion of flour into baked products ready for the consumer at large. Evaluating and predicting wheat flour properties require new equipment and new techniques and these are covered in depth. Cereals other than wheat are given due consideration. The versatility of wheat flour and its conversion into food is reviewed across a whole spectrum of products. There is a strong emphasis on the use of wheat flour for bread making but with consideration of applications in the manufacture of cakes, cookies, pastries, extruded foods, pasta and noodles. The development process and the benefits to consumers are also addressed. The Editors and the Organising Committee have assembled a collection of high-quality papers which provide a showpiece for the latest developments in cereal science and technology. Extensive collection of proceedings from the 12th International Cereal and Bread Congress High-quality papers highlighting the most recent developments in cereal science and technology Benefits for the industry and consumers are discussed