Biofuel Sources Extraction And Determination
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Improvement of Crop Plants for Industrial End Uses
This book is a single source of information on all aspects of soybean processing and utilization written by experts from around the globe. Written in an easy-to-read format, this title covers a wide range of topics including the physical and chemical characteristics of soybeans and soybean products; harvest and storage considerations; byproduct utilization; soy foods; and nutritional aspects of soybean oil and protein. Compares soybeans to other vegetable oils as a source of edible oil products. Presents a wide range of topics including chemistry, production, food use, byproduct use, and nutritional aspects. Offers practical information ideal for soybean oil plant managers.

CO2-switchable Materials Bioreactors: Sustainable Design and Industrial Applications in Mitigation of GHG Emissions presents and compares the foundational concepts, state-of-the-art design and fabrication of bioreactors. Solidly based on theoretical fundamentals, the book examines various aspects of the commercially available bioreactors, such as construction and fabrication, design, modeling and simulation, development, operation, maintenance, management and target applications for biofuels production and bio-waste management. Emerging issues in commercial feasibility are explored, constraints and pathways for upscaling, and techno-economic assessment are also covered. This book provides researchers and engineers in the biofuels and waste management sectors a clear, at-a-glance understanding of the actual potential of different advanced bioreactors for their requirements. It is a must-have reference for better-informed decisions when selecting the appropriate technology models for sustainable systems development and commercialization.
Microalgae Cultivation for Biofuels Production The edited volume presents the progress of first and second generation biofuel production technology in selected countries. Possibility of producing alternative fuels containing biocomponents and selected research methods of biofuels exploitation characteristics (also aviation fuels) was characterized. The book shows also some aspects of the environmental impact of the production and biofuels using, and describes perspectives of biofuel production technology development. It provides the review of biorefinery processes with a particular focus on pretreatment methods of selected primary and secondary raw materials. The discussion includes also a possibility of sustainable development of presented advanced biorefinery processes.

Frontiers in Bioenergy and Biofuels Microalgae Cultivation for Biofuels Production explores the technological opportunities and challenges involved in producing economically competitive algal-derived biofuel. The book discusses efficient methods for cultivation, improvement of harvesting and lipid extraction techniques, optimization of conversion/production processes of fuels and co-products, the integration of microalgae biorefineries to several industries, environmental resilience by microalgae, and a techno-economic and lifecycle analysis of the production chain to gain maximum benefits from microalgae biorefineries. Provides an overview of the whole production chain of microalgal biofuels and other bioproducts Presents an analysis of the economic and sustainability aspects of the production chain Examines the integration of microalgae biorefineries into several industries

Renewable Fuel Standard The subject of this book is “Biofuel and Bioenergy Technology”. It aims to publish high-quality review and research papers, addressing recent advances in biofuel and bioenergy. State-of-the-art studies of advanced techniques of biorefinery for biofuel production are also included. Research involving experimental studies, recent developments, and novel and emerging technologies in this field are covered. This book contains twenty-seven technical papers which cover diversified biofuel and bioenergy technology-related research that have shown critical results and contributed significant findings to the fields of biomass processing, pyrolysis, bio-oil and its emulsification; transesterification and biodiesel, gasification and syngas, fermentation and biogas/methane, bioethanol and alcohol-based fuels, solid fuel and biochar, and microbial fuel cell and power generation development. The published contents relate to the most important techniques and analyses applied in the biofuel and bioenergy technology.

Liquid Biphasic System Sustainable Bioenergy: Advances and Impacts presents a careful overview of advances and promising innovation in the development of various bioenergy technologies. It covers the production of bio-jet fuel, algal biofuels, recent developments in bioprocesses, nanotechnology applications for energy conversion, the role of different catalysts in the production of biofuels, and the impacts of those fuels on society. The book brings together global experts to form a big picture of cutting-edge research in sustainable bioenergy and biofuels. It is an ideal resource for researchers, students, energy analysts and policymakers who will benefit from the book’s overview of impacts and innovative needs. Explores the most recent advances in biofuels and related energy systems, including innovations in catalysts and biocatalysts Provides an overview of the impacts of bioenergy and its sustainability aspects Discusses real-life cases of implementation of bioenergy systems on an industrial scale
Sustainable Development of Algal Biofuels in the United States Advances in Feedstock Conversion Technologies for Alternative Fuels and Bioproducts: New Technologies, Challenges and Opportunities highlights the novel applications of, and new methodologies for, the advancement of biological, biochemical, thermochemical and chemical conversion systems that are required for biofuels production. The book addresses the environmental impact of value added bio-products and agricultural modernization, along with the risk assessment of industrial scaling. The book also stresses the urgency in finding creative, efficient and sustainable solutions for environmentally conscious biofuels, while underlining pertinent technical, environmental, economic, regulatory and social issues. Users will find a basis for technology assessments, current research capability, progress, and advances, as well as the challenges associated with biofuels at an industrial scale, with insights towards forthcoming developments in the industry. Presents a thorough overview of new discoveries in biofuels research and the inherent challenges associated with scale-up Highlights the novel applications and advancements for biological, biochemical, thermochemical and chemical conversion systems that are required for biofuels production Evaluates risk management concerns, addressing the environmental impact of value added bio-products and agricultural modernization, and the risk assessment of industrial scaling

Sustainable Bioenergy Master’s Thesis from the year 2014 in the subject Energy Sciences, course: Biofuels, language: English, abstract: In this study, the utilization of waste coffee residue for biodiesel production, its solid byproduct after oil extraction for bioethanol production, as well as the second byproduct after bioethanol production for solid fuel and compost production was investigated. For the study, waste coffee residue sample was collected from TOMOCA PLC, Addis Ababa, Ethiopia. The oil was then extracted using n-hexane and resulted in oil yield of 19.73 %w/w. The biodiesel was obtained by a two-step process, i.e. acid catalyzed esterification followed by base catalyzed transesterification using catalysts sulfuric acid and sodium hydroxide respectively. The conversion, after esterification of waste coffee residue oil in to biodiesel, was about 80.4%. Various parameters that are essential for biodiesel quality were evaluated using the American Standard for Testing Material (ASTM D 6751- 09). The results obtained for kinematic viscosity (5.3 mm2/s), carbon residue (0.033%), flash point (222°C), ash content (0.0123%), water and sediment (Nanomaterials Discusses the American dependence on imported fossil fuel and proposes a solution in the form of biodiesel engines.

Advances in Biofuels and Bioenergy Microalgae are one of the most studied potential sources of biofuels and bioenergy. This book covers the key steps in the production of renewable biofuels from microalgae - strain selection, culture systems, inorganic carbon utilisation, lipid metabolism and quality, hydrogen production, genetic engineering, biomass harvesting, extraction. Greenhouse gas and techno-economic modelling are reviewed as is the 100 year history of microalgae as sources of biofuels and of commercial-scale microalgae culture. A summary of relevant basic standard methods used in the study of microalgae culture is provided. The book is intended for the expert and those starting work in the field.

Sustainable Degradation of Lignocellulosic Biomass The use of fossil fuels results in rising CO2 and other greenhouse gas (GHG) emissions, causing global temperature
rise and climate change that will negatively impact human health, the food supply, and eventually worsen hunger and misery. Presently, fossil fuels meet 88% of the energy demand, resulting in rising CO2/GHG emissions at alarming rates. The increased use of biofuels would help to mitigate climate change. Efficiently designing methods for the production of biofuels and plant-derived high-value products requires a deeper understanding of photosynthetic processes as a prerequisite for applying novel biotechnologies. Accordingly, this book provides ample information and a wealth of illustrative examples. The book’s eighteen richly illustrated chapters are divided into three thematic parts. I: Photosynthesis and Biomass Production under Changing Conditions, II: Microalgae and Engineered Crops for Production of Biofuels and High-value Products, and III: Genetic Resources and Engineering Methods to Improve Crop Plants. Readers will find the latest information on the molecular basis of photosynthetic processes in plants (including the regulatory principles that allow plants to maintain homeostasis under changing conditions), stress resistance and synthetic pathways. In addition, the basic principles of important biotechnologies, as well as examples of specially designed crops capable of growing under stress conditions with improved productivity, are presented. The book sets the course for future research in the field of biofuel development and production and provides both general and specific information for students, teachers, academic researchers, industrial teams, and general readers who are interested in new developments concerning the production of biofuels with value-added properties.

Biomass Now Because of its ability to reduce tiredness, sleep deprivation and improve alertness, caffeine emerged in the twenty-first century as a miraculous specific, which allows humans to cross their normal physiological and psychological body limits. Its attractiveness comes from its natural origins and strong psycho-stimulating properties, with relatively weak side effects. Caffeine studies carry the hope to understand the associations between inherited genotype and drug action and to find highly personalized treatments for various diseases, more sophisticated drug delivery systems, safer ways of protecting plants and cheap, renewable fuels. This book consists of chapters covering caffeine history, methods of its determination and not only astonishing medicinal but also non-medicinal applications. It is our hope that every reader will find in this book something interesting, inspiring, informative and stimulating.

Lost Crops of Africa This book discusses various renewable energy resources and technologies. Topics covered include recent advances in photobioreactor design; microalgal biomass harvesting, drying, and processing; and technological advances and optimised production systems as prerequisites for achieving a positive energy balance. It highlights alternative resources that can be used to replace fossil fuels, such as algal biofuels, biodiesel, bioethanol, and biohydrogen. Further, it reviews microbial technologies, discusses an immobilization method, and highlights the efficiency of enzymes as a key factor in biofuel production. In closing, the book outlines future research directions to increase oil yields in microalgae, which could create new opportunities for lipid-based biofuels, and provides an outlook on the future of global biofuel production. Given its scope, the book will appeal to all researchers and engineers working in the renewable energy sector.

Bioreactors This publication covers a wide array of co-products.

The Biodiesel Handbook This book offers the current state of knowledge in the field of
biofuels, presented by selected research centers from around the world. Biogas from waste production process and areas of application of biomethane were characterized. Also, possibilities of applications of wastes from fruit bunch of oil palm tree and high biomass/bagasse from sorghum and Bermuda grass for second-generation bioethanol were presented. Processes and mechanisms of biodiesel production, including the review of catalytic transesterification process, and careful analysis of kinetics, including bioreactor system for algae breeding, were widely analyzed. Problem of emissivity of NOx from engines fueled by B20 fuel was characterized. The closing chapters deal with the assessment of the potential of biofuels in Turkey, the components of refinery systems for production of biodegradable plastics from biomass. Also, a chapter concerning the environmental conditions of synthesis gas production as a universal raw material for the production of alternative fuels was also added.

Algae Energy Downstream bioprocesses have a significant role to play in the creation of a sustainable biobased economy, enabling the creation of new products and systems from the more sustainable bioprocessing of natural products. Liquid Biphasic System: Fundamentals and Applications in Bioseparation Technology explores in detail the fundamental processes and applications of this new separation system, aiding in the understanding of the basic principles of the technique and offering constructive criticisms of the latest findings. Including coverage of the background, principles, mechanisms, and applications, Liquid Biphasic System addresses how to adapt the technology for the purification of useful compounds with greater cost efficiency and greener processing. It is essential reading for bioprocess engineers, biochemical engineers, biosystem engineers, chemists, and microbiologists working in the fields of bioprocessing. Researchers, scientists, and engineers concerned with the selection and evaluation of alternative bioseparation processes will find the book particularly useful. Provides information and examples of advanced separations in a single source Includes detailed descriptions of novel bioseparation systems Covers the latest technologies related to advanced liquid–liquid separation and their applications in various industries

Radiation Effects in Materials Oil Seed Crops: Yield and Adaptations under Environmental Stress is a state-of-the-art reference that investigates the effect of environmental stress on oil seed crops and outlines effective ways to reduce stress and improve crop yield. With attention to physiological, biochemical, molecular, and transgenic approaches, the chapters discuss a variety of oil seed crops and also cover a broad range of environmental stressors including microbes, salt, heavy metals, and climate change. Featuring up-to-date research from a global group of experts, this reference provides innovative recommendations for mitigating environmental stress and promoting the healthy growth, development, and adaptation of crops.

Biodiesel Algae Energy covers the production of algae culture and the usage of algal biomass conversion products. It also reviews modern biomass-based transportation fuels, including biodiesel, bio-oil, biomethane and biohydrogen. Each chapter opens with fundamental explanations suitable for those with a general interest in algae energy and goes on to provide in-depth scientific details for more expert readers. Algae energy is discussed within the wider context of green energy, with chapters covering topics such as: green energy facilities, algae technology, energy from algae and biodiesel from algae. Algae Energy addresses the needs of energy researchers,
chemical engineers, fuel and environmental engineers, postgraduate and advanced undergraduate students, and others interested in a practical tool for pursuing their interest in bio-energy.

Advances in Feedstock Conversion Technologies for Alternative Fuels and Bioproducts This book provides important aspects of sustainable degradation of lignocellulosic biomass which has a pivotal role for the economic production of several value-added products and biofuels with safe environment. Different pretreatment techniques and enzymatic hydrolysis process along with the characterization of cell wall components have been discussed broadly. The following features of this book attribute its distinctiveness: This book comprehensively covers the improvement in methodologies for the biomass pretreatment, hemicellulose and cellulose breakdown into fermentable sugars, the analytical methods for biomass characterization, and bioconversion of cellulosics into biofuels. In addition, mechanistic analysis of biomass pretreatment and enzymatic hydrolysis have been discussed in details, highlighting key factors influencing these processes at industrial scale.

Liquid, Gaseous and Solid Biofuels Production and utilization of sustainable energy toward maintaining a clean environment is a major challenge. At the same time, the continued depletion of fossil fuels and the global dependency on non-renewable fuels is a chief concern. Moreover, the long-term economic and environmental issues associated with the high utilization of fossil fuel, such as global warming, are also important, particularly in the context of the predicted increase in the global population to around 5 billion by 2050. In recent years, researchers have been investigating alternative, renewable fuels to replace fossil fuels. Of the various options, biofuels are especially attractive due to their low production costs and the fact that they are pollution free. Also known as transportation fuels, their energy is derived from biological resources or through the biological processes. Biofuels such as biohydrogen, biomethane, biogas, ethanol and butanol offer a number of advantages and can be economically produced from cellulosic biomass. As such, they can play a vital role in sustainably meeting future energy demands. Biofuels have the potential to become a global primary energy source, offering significant reductions in greenhouse gas emissions as well as opportunities to increase economic and social development in rural communities and reduce the problems associated with waste disposal. However, low yields and lack of process technology are some of the aspects that need to be addressed. This book offers an overview of existing biofuels and the technologies to solve the problems associated with their practical implementation. Evaluating the biofuel options and discussing the opportunities and risks in relation to resources, technologies, practices, markets and policy, it provides insights into the development of economically viable bioenergy industries.

Liquid, Gaseous and Solid Biofuels Due to their high growth rate, algae, microalgae, and aquatic plants are becoming the most promising photosynthetic organisms for biofuel production. Advances in Biofuel Production: Algae and Aquatic Plants explores current investigations and application of the fields of biofuel production and bioengineering and considers from a global context the evolving processes of algal biofuel production. The book looks at how biomass, specifically sugars, nonedible plant materials, and algae (which are designated first, second, and third fuels respectively) are used in the production of fuel. The feasibility of such projects, current methodologies, and how to optimize biofuel production are presented.
The Question of Caffeine This two-volume book on biomass is a reflection of the increase in biomass related research and applications, driven by overall higher interest in sustainable energy and food sources, by increased awareness of potentials and pitfalls of using biomass for energy, by the concerns for food supply and by multitude of potential biomass uses as a source material in organic chemistry, bringing in the concept of bio-refinery. It reflects the trend in broadening of biomass related research and an increased focus on second-generation bio-fuels. Its total of 40 chapters spans over diverse areas of biomass research, grouped into 9 themes.

Biofuels. Sequential volarization of waste coffee grounds to Biodiesel, Bioethanol, and solid fuel The study of radiation effects has developed as a major field of materials science from the beginning, approximately 70 years ago. Its rapid development has been driven by two strong influences. The properties of the crystal defects and the materials containing them may then be studied. The types of radiation that can alter structural materials consist of neutrons, ions, electrons, gamma rays or other electromagnetic waves with different wavelengths. All of these forms of radiation have the capability to displace atoms/molecules from their lattice sites, which is the fundamental process that drives the changes in all materials. The effect of irradiation on materials is fixed in the initial event in which an energetic projectile strikes a target. The book is distributed in four sections: Ionic Materials; Biomaterials; Polymeric Materials and Metallic Materials.

Biofuel Production Technologies: Critical Analysis for Sustainability This book provides concerns useful to promote an increase of the productivity of crops by using functional genomics. Fundamental thematics have been addressed: metabolic engineering, plant breeding tools, renewable biomass for energy generation, fibres and composites, and biopharmaceuticals. The gained know how is relevant to identify bottlenecks in the major production chains and to propose actions for moving these issues forward.

Advances in Biofuel Production This Brief provides a concise review of the potential use of microalgae for biofuel production. The following topics are highlighted: the advantages of microalgae over conventional biofuel-producing crops; technological processes for energy production using microalgae; microalgal biomass production systems, production rates and costs; algae cultivation strategies and main culture parameters; biomass harvesting technologies and cell disruption; CO2 sequestration; life cycle analysis; and algal biorefinery strategies. The conclusions section discusses the contribution of the technologies described to environmental sustainability and future prospects.

Biofuel and Bioenergy Technology This book is the outcome of contributions by many experts in the field from different disciplines, various backgrounds, and diverse expertise. This book provides information on biomass volume calculation methods and biomass valorization for energy production. The chapters presented in this book include original research and review articles. I hope the research presented in this book will help to advance the use of biomass for bioenergy production and valorization. The key features of the book are: Providing information on biomass volume estimation using direct, nondestructive and remote sensing methods. Biomass valorization for energy using thermochemical (gasification and pyrolysis) and biochemical (fermentation) conversion processes.
Biomass Volume Estimation and Valorization for Energy Frontiers in Bioenergy and Biofuels presents an authoritative and comprehensive overview of the possibilities for production and use of bioenergy, biofuels, and coproducts. Issues related to environment, food, and energy present serious challenges to the success and stability of nations. The challenge to provide energy to a rapidly increasing global population has made it imperative to find new technological routes to increase production of energy while also considering the biosphere's ability to regenerate resources. The bioenergy and biofuels are resources that may provide solutions to these critical challenges. Divided into 25 discreet parts, the book covers topics on characterization, production, and uses of bioenergy, biofuels, and coproducts. Frontiers in Bioenergy and Biofuels provides an insight into future developments in each field and extensive bibliography. It will be an essential resource for researchers and academic and industry professionals in the energy field.

Climate Change, Photosynthesis and Advanced Biofuels Bioenergy is coming to be seen as a priority on the international agenda, with the use of liquid biofuels a key strategy in the attempt to meet both the demand for environmental sustainability and the energy needs of countries. The growth in the production and use of biofuels around the world has led to increased interest and discussion about this subject. Given the dynamics of this phenomenon, the organizers of this book, based on more than 10 years experience of joint research on this subject, seek to address key issues relating to the production and marketing of liquid biofuels using the Brazilian experience with ethanol and biodiesel as an illustrative case, as well as the experiences of the leading producers and consumers of biofuels. The topics to be covered in this book include the role of public policies in fostering the emergence of the biofuels industry, the main socio-economic, environmental, technological aspects and the prospects for the sector. The conceptual and methodological bases that provide analytical support to the book are based on recent research published in indexed journals. The structure and content of the book seek to address some central issues regarding: How the biofuel industries have emerged and developed in different countries? What factors have been crucial to the success or failure of different production initiatives? What are the main socio-economic-environmental impacts of the production and consumption of liquid biofuels? How are national and international markets for liquid biofuels being structured? To what extent and/or in what conditions can the experiences and lessons learned at the national level be transferred and adapted in other countries? Finally, based on the scenarios, the prospects for liquid biofuels will be discussed.

Practical Handbook of Soybean Processing and Utilization Biofuels made from algae are gaining attention as a domestic source of renewable fuel. However, with current technologies, scaling up production of algal biofuels to meet even 5 percent of U.S. transportation fuel needs could create unsustainable demands for energy, water, and nutrient resources. Continued research and development could yield innovations to address these challenges, but determining if algal biofuel is a viable fuel alternative will involve comparing the environmental, economic and social impacts of algal biofuel production and use to those associated with petroleum-based fuels and other fuel sources. Sustainable Development of Algal Biofuels was produced at the request of the U.S. Department of Energy.

Oilseed Crops This book offers reviews of state-of-the-art conversion techniques for biofuels. It focuses on the latest development for the production of liquid and
gaseous biofuels that should be of interest to the chemical scientists and technologists.

Prospects of Renewable Bioprocessing in Future Energy Systems In the United States, we have come to depend on plentiful and inexpensive energy to support our economy and lifestyles. In recent years, many questions have been raised regarding the sustainability of our current pattern of high consumption of nonrenewable energy and its environmental consequences. Further, because the United States imports about 55 percent of the nation’s consumption of crude oil, there are additional concerns about the security of supply. Hence, efforts are being made to find alternatives to our current pathway, including greater energy efficiency and use of energy sources that could lower greenhouse gas (GHG) emissions such as nuclear and renewable sources, including solar, wind, geothermal, and biofuels. The United States has a long history with biofuels and the nation is on a course charted to achieve a substantial increase in biofuels. Renewable Fuel Standard evaluates the economic and environmental consequences of increasing biofuels production as a result of Renewable Fuels Standard, as amended by EISA (RFS2). The report describes biofuels produced in 2010 and those projected to be produced and consumed by 2022, reviews model projections and other estimates of the relative impact on the prices of land, and discusses the potential environmental harm and benefits of biofuels production and the barriers to achieving the RFS2 consumption mandate. Policy makers, investors, leaders in the transportation sector, and others with concerns for the environment, economy, and energy security can rely on the recommendations provided in this report.

Algae for Biofuels and Energy The second edition of this invaluable handbook covers converting vegetable oils, animal fats, and used oils into biodiesel fuel. The Biodiesel Handbook delivers solutions to issues associated with biodiesel feedstocks, production issues, quality control, viscosity, stability, applications, emissions, and other environmental impacts, as well as the status of the biodiesel industry worldwide. Incorporates the major research and other developments in the world of biodiesel in a comprehensive and practical format. Includes reference materials and tables on biodiesel standards, unit conversions, and technical details in four appendices. Presents details on other uses of biodiesel and other alternative diesel fuels from oils and fats.

Microalgae as a Feedstock for Biofuels CO2-responsive materials are a relatively recent innovation. In general, stimuli-responsive materials exhibit reversible changes in their physical or chemical properties in response to external triggers such as temperature, pH, light, or voltage. However, there are often limitations in applying these triggers including economic and environmental costs, and product contamination. The realization that CO2 can be used as an effective trigger for stimulating changes in material properties has prompted a surge in interest in this area within the past few years, with numerous new studies currently underway in several countries. CO2 is an ideal trigger for switchable or stimuli-responsive materials because it is benign, inexpensive, green, abundant, and does not accumulate in the system. Many different CO2-responsive materials including polymers, latexes, solvents, solutes, gels, surfactants, and catalysts have been prepared. Summarizing recent progress in the preparation, self-assembly, and functional applications of CO2-responsive materials, this book explores the physical chemistry of CO2-switching, including constraints on structural design and process
conditions, together with applications. With emphasis on the environmental, health, and safety advantages and disadvantages compared to conventional materials, it is ideal for researchers and industrialists working in green chemistry, chemical engineering, and polymer chemistry.

From the Fryer to the Fuel Tank Biodiesel: A Realistic Fuel Alternative for Diesel Engines describes the production and characterization of biodiesel. The book also presents current experimental research work in the field, including techniques to reduce biodiesel’s high viscosity. Researchers in renewable energy, as well as fuel engineers, will discover a myriad of new ideas and promising possibilities.

Biofuels This book offers reviews of state-of-the-art conversion techniques for biofuels. It focuses on the latest development for the production of liquid and gaseous biofuels that should be of interest to the chemical scientists and technologists.

Bioenergy and Biofuels The worldwide consumption of fossil fuel continues to increase at unsustainable levels, which will lead to progressive scarcity, if immediate and innovative measures are not taken for its sustainable use. This scarcity necessitates the development of renewable and sustainable alternatives for fossil fuels. A possible solution to today’s energy challenges can be provided by biofuels. This book intends to provide the reader with a comprehensive overview of the current status and the future implications of biofuels. Diverse and aptly covered comprehensive information in this book will directly enhance both basic and applied research in biofuels and will particularly be useful for students, scientists, breeders, growers, ecologists, industrialists and policy makers. It will be a valuable reference point to improve biofuels in the areas of ecologically and economically sustainable bioenergy research.

Liquid Biofuels: Emergence, Development and Prospects Nanomaterials: Application in Biofuels and Bioenergy Production Systems looks at how biofuels and bioenergy can be part of the "sustainable" solution to the world’s energy problems. By addressing bioenergy products compared to their fossil energy counterparts, covering research and development in biofuels applied with nanomaterials this book analyzes the future trends and how biofuels and bioenergy can contribute to its optimization. Starting from fundamentals up to synthesis, characterization and applications of nanomaterials in biofuels and bioenergy production systems, the chapters include the procedures needed for introducing nanomaterials in these specific sectors along with the benefits derived from their applications. Including the hazards and environmental effects of nanomaterials in bioenergy applications, sustainability issues and a techno-economic analysis of the topic, this book provides researchers in bioscience, energy & environment and bioengineering with an up to date look at the full life cycle assessment of nanomaterials in bioenergy. Provides a one stop solution manual for applications of nanomaterials in bioenergy and biofuels Includes biofuel applications with compatible global application case studies Addresses the demand for environmental and techno-economic analysis of nanomaterials applications

Biofuel Co-products as Livestock Feed This book aims to inform readers about the recent developments in bioenergy and biofuels covering current issues from an interdisciplinary approach. It will also feature coverage of anticipated future trends
related to each particular biofuel. Chapters will consist of original research presented by world class experts in their respective fields. A number of interdisciplinary areas will be incorporated such as Energy & Fuels, Biotechnology, Genomics, Economics, Optimization, Chemical Engineering, Mechanical Engineering and Algae Science. Examples will relate to a matrix of biofuel and energy types such as bioethanol, biobutanol, and biomethane.

Biofuels This book is the third in a series evaluating underexploited African plant resources that could help broaden and secure Africa's food supply. The volume describes 24 little-known indigenous African cultivated and wild fruits that have potential as food- and cash-crops but are typically overlooked by scientists, policymakers, and the world at large. The book assesses the potential of each fruit to help overcome malnutrition, boost food security, foster rural development, and create sustainable landcare in Africa. Each fruit is also described in a separate chapter, based on information provided and assessed by experts throughout the world. Volume I describes African grains and Volume II African vegetables.

Liquid, Gaseous and Solid Biofuels This book offers reviews of state-of-the-art conversion techniques for biofuels. It focuses on the latest development for the production of liquid and gaseous biofuels that should be of interest to the chemical scientists and technologists.

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