

Production Of Biodiesel From Vietnamese Waste Coffee Beans

In 2010, esteemed researchers gathered at a workshop held at the Richardson Centre for Functional Foods and Nutraceuticals at the University of Manitoba in Winnipeg, Canada. Drawn from these proceedings, *Canola and Rapeseed: Production, Processing, Food Quality, and Nutrition* presents state-of-the-art information on the chemistry of the minor constituents of canola and rapeseed and their impact on human health. The book also identifies new areas of research and opportunities for the industrial application of functional foods and nutraceuticals from canola and rapeseed. Topics include: The historical development, properties, and performance of canola Characteristics and bioactives of sinapic acid derivatives and the decarboxylation pathways leading to their formation Canola protein processing High omega-9 canola oils and their future applications Modification of Brassica oilseeds Rapid analytical methods for measuring oil content The potential of ultrasound and supercritical fluid extraction for producing value-added by-products The processing of virgin rapeseed oils in Europe Extraction and application of canola protein The frying stability of high-oleic low-linolenic acid canola oils The potential of mustard oil for biodiesel The final chapters demonstrate the health benefits of canola, including antioxidant, antimutagenic, and anticancer properties. Authored by experienced researchers in the field, the book chapters have been expanded considerably to include a number of areas not contained in the original workshop, providing comprehensive coverage of the potential of this essential crop.

Fuels, Chemicals and Materials from the Oceans and Aquatic Sources provides a holistic view of fuels, chemicals and materials from renewable sources in the oceans and other aquatic media. It presents established and recent results regarding the use of water-based biomass, both plants and animals, for value-added applications beyond food. The book begins with an introductory chapter which provides an overview of ocean and aquatic sources for the production of chemicals and materials. Subsequent chapters focus on the use of various ocean bioresources and feedstocks, including microalgae, macroalgae, and waste from aquaculture and fishing industries, including fish oils, crustacean and mollusc shells. *Fuels, Chemicals and Materials from the Oceans and Aquatic Sources* serves as a valuable reference for academic and industrial professionals working on the production of chemicals, materials and fuels from renewable feedstocks. It will also prove useful for researchers in the fields of green and sustainable chemistry, marine sciences and biotechnology. For more information on the Wiley Series in Renewable Resources, visit www.wiley.com/go/rrs Topics covered include: Production and conversion of green macroalgae Marine macroalgal biomass as an energy feedstock Microalgae bioproduction Bioproduction and utilization of chitin and chitosan Applications of mollusc shells Crude fish oil as a potential fuel

"Sustainable Energy - Recent Studies" is a collection of six different chapters. The papers that are included in this book cover some specific areas within district heating, photovoltaic, bioenergy, wind energy, industrial energy auditing and indoor air quality. The overall theme is improving sustainability where efficient energy utilisation, integration of renewable energy sources and technological improvements are highlighted.

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In this study, the use of waste coffee grounds for biodiesel production, its solid by-product after oil extraction for bioethanol generation, and the second by-product after bioethanol generation for solid fuel generation is explored. For the study, waste coffee grounds samples were gathered from TOMOCA PLC, Addis Ababa, Ethiopia. The oil was then concentrated utilizing n-hexane and brought about an oil yield of 19.73 %w/w. The biodiesel was acquired by a two-stage process, i.e. acid catalyzed esterification followed by base catalyzed transesterification utilizing catalysts sulfuric acid and sodium hydroxide respectively. The change, after esterification of waste coffee grounds oil into biodiesel, was about 80.4%w/w. Different parameters that are fundamental for biodiesel quality were assessed utilizing the American Standard for Testing Material (ASTM D 6751- 09) and revealed that all quality parameters are inside the extent pointed out aside from acid value. Also, the strong waste staying after oil extraction was researched for conceivable use as a feedstock for the generation of bioethanol and brought about a bioethanol yield of 8.3 %v/v. Moreover, the solid waste staying after bioethanol generation was assessed for solid fuel (20.8 MJ/Kg) applications.

Microbial communities and their functions play a crucial role in the management of ecological, environmental and agricultural health on the Earth. Microorganisms are the key identified players for plant growth promotion, plant immunization, disease suppression, induced resistance and tolerance against stresses as the indicative parameters of improved crop productivity and sustainable soil health. Beneficial belowground microbial interactions with the rhizosphere help plants mitigate drought and salinity stresses and alleviate water stresses under the unfavorable environmental conditions in the native soils. Microorganisms that are inhabitants of such environmental conditions have potential solutions for them. There are potential microbial communities that can degrade xenobiotic compounds, pesticides and toxic industrial chemicals and help remediate even heavy metals, and thus they find enormous applications in environmental remediation. Microbes have developed intrinsic metabolic capabilities with specific metabolic networks while inhabiting under specific conditions for many generations and, so play a crucial role. The book *Microbial Interventions in Agriculture and Environment* is an effort to compile and present a great volume of authentic, high-quality, socially-viable, practical and implementable research and technological work on microbial implications. The whole content of the volume covers protocols, methodologies, applications, interactions, role and impact of research and development aspects on microbial interventions and technological outcomes in prospects of agricultural and environmental domain including crop production, plan-soil health management, food & nutrition, nutrient recycling, land reclamation, clean water systems and agro-waste management, biodegradation & bioremediation, biomass to bioenergy, sanitation and rural livelihood security. The covered topics and sub-topics of the microbial domain have high implications for the targeted and wide readership of researchers, students, faculty and scientists working on these areas along with the agri-activists, policymakers, environmentalists, advisors etc. in the Government, industries and non-government level for reference and knowledge generation.

Due to many challenges (i.e. climate change, energy, water and land shortage, high demands on food, land grabbing, etc.), agriculture production potential is expected to be seriously affected; thus, increasing food insecurity and hunger in many already affected regions (especially in Africa). In this context, sustainable agriculture is highly recommended as an eco-system approach where soil, water, plants, environment and living organisms live in harmony. Innovative technologies and research should be developed to ensure sustainable agriculture and productivity using modern irrigation systems, improved varieties, improved soil quality, etc. In the meantime, the preservation of natural environment should be based on resource conservation technologies and

best management practices. Sustainable Agricultural Development, not only raises the serious ethical and social issues underlying these huge environmental problems, but also aims at presenting successful experiences from all over the world in relation with sustainable farming, sustainable management of water and land resources, and innovative processes in livestock production. It also aims at providing inputs to decision making processes and encouraging the transfer of relevant know-how, technologies and expertise to different countries where similar agro-climatic conditions may exist; thus saving precious resources and promoting sustainable agricultural development as a relevant approach to tackle the food security challenge. Finally, this book focuses on the paradigmatic and policy dimensions and call for an innovative approach by analyzing the key themes in a complex and interrelated manner.

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 (This study is one of the first steps to improve understanding of the impacts of biofuel development on agriculture and economy, with specific focus on the Greater Mekong Subregion (GMS).

This report contains the Greater Mekong Subregion Regional Strategic Framework for Biofuel Development. It also presents the executive summaries of this report, the individual biofuel study reports for the six member countries, and the biofuel modeling study. The findings were endorsed at the Fifth Meeting of the Greater Mekong Subregion Working Group on Agriculture on 22-24 September 2008 in Vientiane, the Lao People's Democratic Republic.

Reviews the latest advances in biofuel manufacturing technologies and discusses the deployment of other renewable energy for transportation Aimed at providing an interface useful to business and scientific managers, this book focuses on the key challenges that still impede the realization of the billion-ton renewable fuels vision. It places great emphasis on a global view of the topic, reviewing deployment and green energy technology in different countries across Africa, Asia, South America, the EU, and the USA. It also integrates scientific, technological, and business development perspectives to highlight the key developments that are necessary for the global replacement of fossil fuels with green energy solutions. Green Energy to Sustainability: Strategies for Global Industries examines the most recent developments in biofuel manufacturing technologies in light of business, financial, value chain, and supply chain concerns. It also covers the use of other renewable energy sources like solar energy for transportation and proposes a view of the challenges over the next two to five decades, and how these will deeply modify the industrial world in the third millennium. The coming of age of electric vehicles is also looked at, as is the impact of their deployment on the biomass to biofuels value chain. Offers extensive updates on the field of green energy for global industries Covers the structure of the energy business; chemicals and diesel from biomass; ethanol and butanol; hydrogen and methane; and more Provides an expanded focus on the next generation of energy technologies Reviews the latest advances in biofuel manufacturing technologies Integrates scientific, technological and business perspectives Highlights important developments needed for replacing fossil fuels with green energy Green Energy to Sustainability: Strategies for Global Industries will appeal to academic researchers working on the production of fuels from renewable feedstocks and those working in green and sustainable chemistry, and chemical/process engineering. It is also an excellent textbook for courses in bioprocessing technology, renewable resources, green energy, and sustainable chemistry.

The impacts of climate change on agriculture and food production in Southeast Asia will be largely mediated through water, but climate is only one driver of change. Water resources in the region will be shaped by a complex mixture of social, economic and environmental factors. This report reviews the current status and trends in water management in the Greater Mekong Subregion; assesses likely impacts of climate change on water resources to 2050; examines water management strategies in the context of climate and other changes; and identifies priority actions for governments and communities to improve resilience of the water sector and safeguard food production.

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

This book aspires to be a comprehensive summary of current biofuels issues and thereby contribute to the understanding of this important topic. Readers will find themes including biofuels development efforts, their implications for the food industry, current and future biofuels crops, the successful Brazilian ethanol program, insights of the first, second, third and fourth biofuel generations, advanced biofuel production techniques, related waste treatment, emissions and environmental impacts, water consumption, produced allergens and toxins. Additionally, the biofuel policy discussion is expected to be continuing in the foreseeable future and the reading of the biofuels features dealt with in this book, are recommended for anyone interested in understanding this diverse and developing theme.

Air pollution policy is closely connected with climate change, public health, energy, transport, trade, and agriculture, and

generally speaking, the Earth has been pushed to the brink and the damage is becoming increasingly obvious. The transport sector remains a foremost source of air pollutants – a fact that has stimulated the production of biofuels. This book focuses on the biodiesel industry, and proposes a modification of the entire manufacturing chain that would pave the way for further improvements. Oil derived from oilseed plantations/crops is the most commonly used feedstock for the production of biodiesel. At the same time, the UK's Royal Academy of Engineering and 178 scientists in the Netherlands have determined that some biofuels, such as diesel produced from food crops, have led to more emissions than those produced by fossil fuels. Accordingly, this book re-evaluates the full cycle of biodiesel production in order to help find optimal solutions. It confirms that the production and use of fertilizers for the cultivation of crop feedstocks generate considerably more GHG emissions compared to the mitigation achieved by using biodiesel. To address this fertilization challenge, projecting future biofuel development requires a scenario in which producers shift to an organic agriculture approach that includes the use of microalgae. Among advanced biofuels, algae's advantages as a feedstock include the highest conversion of solar energy, and the ability to absorb CO₂ and pollutants; as such, it is the better choice for future fuels. With regard to the question of why algae's benefits have not been capitalized on for biofuel production, our analyses indicate that the sole main barrier to realizing algae's biofuel potential is ineffective international and governmental policies, which create difficulties in reconciling the goals of economic development and environmental protection.

Interest in biofuels began with oil shocks in the 1970's, but the more rapid development and consumption of biofuel industry in recent years has been primarily driven by mandates, subsidies, climate change concerns, emissions targets and energy security. From 2004 to 2006, fuel ethanol grew by 26% and biodiesel grew by 172%. As biofuel production continues to expand, investments in capacity expansion and research and development have been made. The 2008 food crisis emphasized the need to re-examine biofuel consequences. Biofuels remain an important renewable energy resource to substitute for fossil fuels, particularly in the transportation sector, yet biofuels' success is still uncertain. The future of biofuels in the energy supply mix relies on mitigating potential and improving the environmental gains. This book brings together leading authorities on biofuel from the World Bank to examine all of the impacts of biofuel (economic, social, environmental) within a unified framework and in a global perspective, making it of interest to academics in agricultural and environmental economics as well as industry and policy-makers.

What role will biofuels play in the scientific portfolio that might bring energy independence and security, revitalize rural infrastructures, and wean us off of our addiction to oil? The shifting energy landscape of the 21st century, with its increased demand for renewable energy technology, poses a worrying challenge. Discussing the multidisciplinary

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This comprehensive volume developed under the guidance of guest editors Prakash Lakshmanan and David Songstad features broad coverage of the topic of biofuels and its significance to the economy and to agriculture. These chapters were first published by In Vitro Cellular and Developmental Biology In Vitro Plant in 2009 and consists of 15 chapters from experts who are recognized both for their scientific accomplishments and global perspective in their assigned topics.

Explores Worldwide Trends Involving the Production and Use of Biofuels With the depletion of oil resources as well as the negative environmental impact of fossil fuels, there is much interest in alternative energy sources. Focusing on some of the most important alternate energy sources for the foreseeable future, the Handbook of Plant-

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A comprehensive and up-to-date reference covering both conventional and novel industrial fermentation technologies and their applications Fermentation and cell culture technologies encompass more than the conventional microbial and enzyme systems used in the agri-food, biochemical, bioenergy and pharmaceutical industries. New technologies such as genetic engineering, systems biology, protein engineering, and mammalian cell and plant cell systems are expanding rapidly, as is the demand for sustainable production of bioingredients, drugs, bioenergy and biomaterials. As the growing biobased economy drives innovation, industrial practitioners, instructors, researchers, and students must keep pace with the development and application of novel fermentation processes and a variety of cell technologies. Advanced Fermentation and Cell Technology provides a balanced and comprehensive overview of the microbial, mammalian, and plant cell technologies used by the modern biochemical process industry to develop new and improved processes and products. This authoritative volume covers the essential features of advanced fermentation and cell technology, and highlights the interaction of food fermentation and cell culture biopharmaceutical activities. Detailed chapters, organized into five sections, cover microbial cell technology, animal and plant cell technology, safety issues of new biotechnologies, and applications of microbial fermentation to food products, chemicals, and pharmaceuticals.

Written by an internationally-recognized expert in food biotechnology, this comprehensive volume: Covers both conventional and novel industrial fermentation technologies and their applications in a range of industries Discusses current progress in novel fermentation, cell culture, commercial recombinant bioproducts technologies Includes overviews of the global market size of bioproducts and the fundamentals of cell technology Highlights the importance of sustainability, Good Manufacturing Practices (GMP), quality assurance, and regulatory practices Explores microbial cell technology and culture tools and techniques such as genome shuffling and recombinant DNA technology, RNA interference and CRISPR technology, molecular thermodynamics, protein engineering, proteomics and bioinformatics, and synthetic biology Advanced Fermentation and Cell Technology is an ideal resource for students of food science, biotechnology, microbiology, agricultural sciences, biochemical engineering, and biochemistry, and is a valuable reference for food scientists, researchers, and technologists throughout the food industry, particularly the dairy, bakery, and fermented beverage sectors.

For anyone who is trying to keep up with the extremely rapid developments in the biodiesel industry, the second edition of Biodiesel: Growing a New Energy Economy is an invaluable aid. The breathtaking speed with which biodiesel has gained

acceptance in the marketplace in the past few years has been exceeded only by the proliferation of biodiesel production facilities around the United States--and the world--only to confront new social and environmental challenges and criticisms. The international survey of the biodiesel industry has been expanded from 40 to more than 80 countries, reflecting the spectacular growth of the industry around the world. This section also tracks the dramatic shifts in the fortunes of the industry that have taken place in some of these nations. The detailed chapters that cover the industry in the United States have also been substantially rewritten to keep abreast of its many new developments and explosive domestic growth. An expanded section on small-scale, local biodiesel production has been added to better represent this small but growing part of the industry. Another new section has been added to more fully explore the increasingly controversial issues of deforestation and food versus fuel, as well as GMO crops. The second edition concludes with updated views on where the industry is headed in the years to come from some of its key players.

This open access book presents a comprehensive analysis of biofuel use strategies from an interdisciplinary perspective using sustainability science. This interdisciplinary perspective (social science-natural science) means that the strategies and policy options proposed will have significant impacts on the economy and society alike. Biofuels are expected to contribute to reducing greenhouse gas emissions, revitalizing economies in agricultural communities and alleviating poverty. However, despite these anticipated benefits, international organizations such as the FAO, OECD and UN have published reports expressing concerns that biofuel promotion may lead to deforestation, water pollution and water shortages. The impacts of biofuel use are extensive, cross-sectoral and complex, and as such, comprehensive analyses are required in order to assess the extent to which biofuels can contribute to sustainable societies. Applying interdisciplinary sustainability science concepts and methodologies, the book helps to enhance the establishment of a sustainable society as well as the development of appropriate responses to a global need for urgent action on current issues related to biofuels.

Energy is crucial to the functioning of any human society and central to understanding East Asia's 'economic miracle'. The region's rapid development over the last few decades has been inherently energy-intensive and the impact on global energy security, climate change and the twenty-first-century global system generally is now very significant and will become more so over foreseeable years and decades to come. The region is already the world's largest energy consumer and greenhouse gas emitter, so establishing cleaner energy systems in East Asia is both a regional and global challenge, and renewable energy has a critically important part to play in meeting it. This book presents a comprehensive study of renewable energy development in East Asia. It begins by examining renewable energy development in global and historic contexts, and situates East Asia's position in the recent worldwide expansion of renewables. This same approach is applied on sector-specific chapter studies on wind, solar, hydropower, geothermal, ocean (wave and tidal) and bioenergy, and to general trends in renewable energy policy. Governments play a critical role in promoting renewables and their contribution to tackling climate change and other environmental challenges. Christopher M. Dent argues this is particularly relevant to East Asia, where state capacity practice has been increasingly allied to ecological modernisation thinking to form what he calls 'new developmentalism', the principal foundation on which renewables have developed in the region as well as how East Asia's low carbon development is being generally promoted. Renewable Energy in East Asia will be of huge interest to students and scholars of Asian studies, economics, political economy, energy studies, business, development, international relations and environmental studies. It will also appeal to researchers working on the subject matter in government, business, international organisations, think tanks and civil society organisations.

This book provides a collection of research and review articles useful for researchers, engineers, students and industry experts in the bioenergy field. The practical and valuable information can be utilized for developing and implementing renewable energy projects, selecting different waste feedstocks, technologies, and products. A detailed insight into advanced technologies such as hydrothermal liquefaction, torrefaction, and supercritical CO₂ extraction for making sustainable biofuels and chemicals is provided. A case study on food waste-to-energy valorization processes in Latin America provides experts' insights to promote a circular economy.

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This publication presents twenty papers delivered at an OECD conference on agricultural research. They highlight recent major progress in agricultural research outcomes and address the challenges that lie ahead.

Providing comprehensive coverage on biofuel crop production and the technological, environmental and resource issues associated with a sustainable biofuel industry, this book is ideal for researchers and industry personnel. Beginning with an introduction to biofuels and the challenges they face, the book then includes detailed coverage on crops of current importance or with high future prospects, including sections on algae, sugar crops and grass, oil and forestry species. The chapters focus on the genetics, breeding, cultivation, harvesting and handling of each crop.

This book applies cost-benefit analysis techniques in the management of environment and natural resources in developing countries of the Southeast Asian region and presents a compendium of studies conducted by researchers supported by the Economy and Environment Program for Southeast Asia (EEPSEA). It emphasizes the close relationship between the environment and natural resources and economic development in such countries, addressing a wide range of problems that can be understood using economic evaluation techniques. General guidelines for conducting economic appraisals are provided, with the case studies illustrating how they can be applied in a developing country context. Cost-Benefit Analysis Application in Environmental and Natural Resource Management in Southeast Asia serves as essential reading for teachers, researchers, students and practitioners in environmental and natural resource economics, economic development and key issues facing policymakers in the Southeast Asian region.

This 2008 edition of the OECD/FAO Agricultural Outlook presents projections for production, consumption and prices to the year 2017 for the main agricultural commodities and biofuels for 39 countries and 19 regions. It also includes an overview chapter and a special chapter on high prices.

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.

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 first 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 giganteus* 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).

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.

Sustainable EnergyRecent StudiesBoD – Books on Demand

This report contains a detailed assessment of the status and potential for the development of biofuels in Viet Nam and presents a country strategy for biofuels development consistent with the Greater Mekong Subregion Regional Strategic Framework for Biofuel Development. The findings were endorsed at the Fifth Meeting of the Greater Mekong Subregion Working Group on Agriculture on 22-24 September 2008 in Vientiane, the Lao People's Democratic Republic.

Covers different categories of green technologies (e.g. biofuels, renewable energy sources, phytoremediation etc.) in a nutshell -Focuses on next generation technologies which will help to attain the sustainable development -The chapters widely cover for students, faculties and researchers in the scientific arena of Environmentalists, Agriculturalists, Engineers and Policy Makers The World Environment Day 2012 is prepared to embrace green economy. The theme for 2012 encompasses various aspects of human living, ranging from transport to energy to food to sustainable livelihood. Green technology, an eco-friendly clean technology contributes to sustainable development to conserve the natural resources and environment which will meet the demands of the present and future generations. The proposed book mainly focuses on renewable energy sources, organic farming practices, phyto/bioremediation of contaminants, biofuels, green buildings and green chemistry. All of these eco-friendly technologies will help to reduce the amount of waste and pollution and enhance the nation's economic growth in a sustainable manner. This book is aimed to provide an integrated approach to sustainable environment and it will be of interest not only to environmentalists but also to agriculturists, soil scientists and bridge the gap between the scientists and policy-makers.

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