

Activated Carbon Fao

We are happy to introduce the Handbook of Charcoal-Making, a comprehensive survey written by a competent expert with international experience. The book was prepared by the Commission of the European Communities in the frame of its R + D programme on biomass. In the European Community today the biomass option is only little developed: a huge resource is waiting for use. Actually, there is ample scope for biomass utilisation as it bears promise in some of the vital sectors of modern society. Development of indigenous and renewable energy sources, creation of new employment, recycling of wastes and improvement of the environment, restructuring of European agriculture, development of the Third World, they are all concerned. It is important to note that the exploitation of the biomass resource is largely related to its conversion into a marketable product. However, as many of the conversion technologies are not yet well established or need improvement, R + D is more than ever the critical pathway to get access to the benefits of biomass utilisation. In the European Communities I R + D programme, thermal conversion of biomass is developed with priority. Gasification as well as pyrolysis development projects are being supported by the Commission in European industry and universities. Pyrolysis is particularly attractive because the conversion products charcoal and pyrolytic oil are very convenient in use, technologies are relatively simple and projected pay-back times favourable. -v- Charcoal making is just the simplest and oldest form of pyrolysis.

Examines the different raw materials, types and applications of activated carbon, plus the processes involved in the production of various carbons. The scope for the use of oil palm kernel shell as a potential feedstock for activation is considered in detail.

This report first provides an outlook for the agricultural and food market and highlights the challenges that population trends, rising global incomes and climate change present to agriculture and water. The following section focuses on two broad areas that require attention and presents recommendations on: (i) policies within the agricultural domain that apply specifically to the sector, such as water supply enhancement, water loss reduction, crop productivity, water re-allocation, and options for rainfed agriculture; and (ii) actions within the water domain that relate to water management for all sectors, not only agriculture.

Energy from solar radiation, fixated by self-assembling plant structures, creates biomass that is converted to energy carriers fit for application in today's and tomorrow's energy-generating equipment. The central theme of this book is the development of the current largest renewable energy source for efficient applications in modern and developing society—biomass. The book is presented in an easy-to-understand manner for non-experts, nevertheless revealing the

true challenges of this extremely broad area. Through this book, passionate pioneers and (ex-)EU officials tell the interesting history of the use of biomass by mankind in general and how the future of its modern use was shaped by active support of the European Union. The book mainly emphasizes specific technologies, both biological and thermo-chemical, from simple to extremely complex. Recognized experts explain these technologies in a clear way along with their future prospects. Climb on the shoulders of all 35 authors of the book and look into the close and distant future where interaction with other renewable sources will occur, and discover a renewable energy future in which an important role will be played by the oldest one—bioenergy.

Many people worldwide lack adequate access to clean water to meet basic needs, and many important economic activities, such as energy production and agriculture, also require water. Climate change is likely to aggravate water stress. As temperatures rise, ecosystems and the human, plant, and animal communities that depend on them will need more water to maintain their health and to thrive. Forests and trees are integral to the global water cycle and therefore vital for water security – they regulate water quantity, quality, and timing and provide protective functions against (for example) soil and coastal erosion, flooding, and avalanches. Forested watersheds provide 75 percent of our freshwater, delivering water to over half the world's population. The purpose of *A Guide to Forest–Water Management* is to improve the global information base on the protective functions of forests for soil and water. It reviews emerging techniques and methodologies, provides guidance and recommendations on how to manage forests for their water ecosystem services, and offers insights into the business and economic cases for managing forests for water ecosystem services. Intact native forests and well-managed planted forests can be a relatively cheap approach to water management while generating multiple co-benefits. Water security is a significant global challenge, but this paper argues that water-centered forests can provide nature-based solutions to ensuring global water resilience.

Environmental And Health Aspects of Water Treatment and Supply is a component of *Encyclopedia of Water Sciences, Engineering and Technology Resources* in the global *Encyclopedia of Life Support Systems (EOLSS)*, which is an integrated compendium of twenty one Encyclopedias. The volume presents state-of-the art subject matter of various aspects of *Environmental And Health Aspects of Water Treatment And Supply* such as: *Environmental And Health Aspects Of Water Supply And Sanitation*; *Water Quality And Disinfection*; *Quality Standards For Potable Water*; *Analysis Of Disinfections*; *Disinfectant And Disinfectant By-Products*; *Health Problems And Their Resolution*; *Aquaculture Water Reuse And Health*; *Worldwide Access To Sanitation Services*; *Constraints To Improving Water And Sanitation Services*; *Health Implications Of Some Major Water Development Projects*; *Expected Reduction In Morbidity From Improved Water Supply And Sanitation*; *Development Of Water Resources*; *Arsenic Groundwater Contamination*; *Design Of Water*

Treatment Facilities; Alternative Sewage Disposal Systems; Conjunctive Use Of Water. The volume is aimed at the following five major target audiences: University and College Students Educators, Professional Practitioners, Research Personnel and Policy and Decision Makers

This publication capitalizes on the experience of scientists from the North Africa and Near East countries, in collaboration with experts from around the world, specialized in the different aspects of greenhouse crop production. It provides a comprehensive description and assessment of the greenhouse production practices in use in Mediterranean climate areas that have helped diversify vegetable production and increase productivity. The publication is also meant to be used as a reference and tool for trainers and growers as well as other actors in the greenhouse vegetables value chain in this region.

Food Industry Wastes: Assessment and Recuperation of Commodities, Second Edition presents a multidisciplinary view of the latest scientific and economic approaches to food waste management, novel technologies and treatment, their evaluation and assessment. It evaluates and synthesizes knowledge in the areas of food waste management, processing technologies, environmental assessment, and wastewater cleaning. Containing numerous case studies, this book presents food waste valorization via emerging chemical, physical, and biological methods developed for treatment and product recovery. This new edition addresses not only recycling trends but also innovative strategies for food waste prevention. The economic assessments of food waste prevention efforts in different countries are also explored. This book illustrates the emerging environmental technologies that are suitable for the development of both sustainability of the food systems and a sustainable economy. So, this volume is a valuable resource for students and professionals including food scientists, bio/process engineers, waste managers, environmental scientists, policymakers, and food chain supervisors. Provides guidance on current regulations for food process waste and disposal practices Highlights novel developments needed in policy making for the reduction of food waste Raises awareness of the sustainable food waste management techniques and their appraisal through Life Cycle Assessment Explores options for reducing food loss and waste along the entire food supply chain.

The In Brief version of the FAO flagship publication, In Brief to The State of Food and Agriculture 2020, contains the key messages and main points from the publication and is aimed at the media, policy makers and a more general public.

Food Safety and Human Health provides a framework to manage food safety risks and insure safe food system. This reference takes a reader-friendly approach in presenting the entire range of toxic compounds found naturally in foods or introduced by industrial contamination or food processing methods. It provides the basic principles of food toxicology and its processing and safety for human health to help professionals and students better understand the real problems of toxic materials. This essential resource will help readers address problems regarding food contamination and safety. It will be particularly useful for graduate students, researchers and professionals in the agri-food industry. Encompasses the first pedagogic treatment of the entire range of toxic compounds found naturally in foods or introduced by industrial contamination or food processing methods Features areas of vital concern to consumers, such as the toxicological implications of food, implications of food processing and its safety to human health Focuses on the safety aspects of genetically modified foods currently available

The aim of raising global awareness on the multitude of benefits of pulses was integral to the International Year of Pulses. This coffee table book is part guide and part cookbook—informative without being technical. The book begins by giving an overview of pulses, and explains

why they are an important food for the future. It also has more than 30 recipes prepared by some of the most prestigious chefs in the world and is peppered with infographics. Part I gives an overview of pulses and gives a brief guide to the main varieties in the world. Part II explains step-by-step how to cook them, what to keep in mind and what condiments and instruments to use. Part III underscores the five messages that FAO conveys to the world about the impact pulses have on nutrition, health, climate change, biodiversity and food security. Part IV illustrates how pulses can be grown in a garden patch with easy gardening instructions and how they are grown in the world, highlighting major world producers, importers and exporters. Part V takes the reader on a journey around the world showing how pulses fit a region's history and culture and visits 10 internationally acclaimed chefs as they go the market to buy pulses. Back at their restaurant or home, each chef prepares easy dishes and gives their best kept secrets. Each chef provides 3 recipes that are beautifully illustrated.

Biochar is the carbon-rich product which occurs when biomass (such as wood, manure or crop residues) is heated in a closed container with little or no available air. It can be used to improve agriculture and the environment in several ways, and its persistence in soil and nutrient-retention properties make it an ideal soil amendment to increase crop yields. In addition to this, biochar sequestration, in combination with sustainable biomass production, can be carbon-negative and therefore used to actively remove carbon dioxide from the atmosphere, with potentially major implications for mitigation of climate change. Biochar production can also be combined with bioenergy production through the use of the gases that are given off in the pyrolysis process. The first edition of this book, published in 2009, was the definitive work reviewing the expanding research literature on this topic. Since then, the rate of research activity has increased at least ten-fold, and biochar products are now commercially available as soil amendments. This second edition includes not only substantially updated chapters, but also additional chapters: on environmental risk assessment; on new uses of biochar in composting and potting mixes; a new and controversial field of studying the effects of biochar on soil carbon cycles; on traditional use with very recent discoveries that biochar was used not only in the Amazon but also in Africa and Asia; on changes in water availability and soil water dynamics; and on sustainability and certification. The book therefore continues to represent the most comprehensive compilation of current knowledge on all aspects of biochar.

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The publication was launched at the Global Symposium on Soil Organic Carbon (GSOC) held at FAO headquarters (Rome, 21-23 March 2017). It provides an overview to decision-makers and practitioners of the main scientific facts and information regarding

the current knowledge and knowledge gaps on Soil Organic Carbon. It highlights how better information and good practices may be implemented to support ending hunger, adapting to and mitigating climate change and achieving overall sustainable development.

The aim of this paper is to facilitate the planning and design of land drainage systems for sound land and water management for engineers and other professionals. It considers the integration of technical, socio-economic and environmental factors and the need for system users' participation in the planning, design, operation and maintenance processes. The text provides guidelines for the appropriate identification of drainage problems, for the planning and design of field drainage systems (surface and subsurface) and the main drainage and disposal systems. The annexes provide more detailed information with technical background, appropriate equations, some cross-references for finding appropriate methodologies, and computer programs for calculation of extreme values, of permeability and some land drainage system parameters. --Publisher's description.

The new edition of this highly acclaimed reference provides comprehensive and current information on a wide variety of fruits and processes. Revised and updated by an international team of contributors, the second edition includes the latest advances in processing technology, scientific research, and regulatory requirements. Expanded coverage inclu

Sustainable Food Waste-to-Energy Systems assesses the utilization of food waste in sustainable energy conversion systems. It explores all sources of waste generated in the food supply chain (downstream from agriculture), with coverage of industrial, commercial, institutional and residential sources. It provides a detailed analysis of the conventional pathways for food waste disposal and utilization, including composting, incineration, landfilling and wastewater treatment. Next, users will find valuable sections on the chemical, biochemical and thermochemical waste-to-energy conversion processes applicable for food waste and an assessment of commercially available sustainable food waste-to-energy conversion technologies. Sustainability aspects, including consideration of environmental, economic and social impacts are also explored. The book concludes with an analysis of how deploying waste-to-energy systems is dependent on cross-cutting research methods, including geographical information systems and big data. It is a useful resource for professionals working in waste-to-energy technologies, as well as those in the food industry and food waste management sector planning and implementing these systems, but is also ideal for researchers, graduate students, energy policymakers and energy analysts interested in the most recent advances in the field. Provides guidance on how specific food waste characteristics drive possible waste-to-energy conversion processes Presents methodologies for selecting among different waste-to-energy options, based on waste volumes, distribution and properties, local energy demand (electrical/thermal/steam), opportunities for industrial symbiosis, regulations and incentives and social acceptance, etc. Contains tools to assess potential environmental and economic performance of deployed systems Links to publicly available resources on food waste data for energy conversion

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superior nutrient-retention properties make it an ideal soil amendment to increase crop yields. In addition to this, biochar sequestration, in combination with sustainable biomass production, can be carbon-negative and therefore used to actively remove carbon dioxide from the atmosphere, with major implications for mitigation of climate change. Biochar production can also be combined with bioenergy production through the use of the gases that are given off in the pyrolysis process. This book is the first to synthesize the expanding research literature on this topic. The book's interdisciplinary approach, which covers engineering, environmental sciences, agricultural sciences, economics and policy, is a vital tool at this stage of biochar technology development. This comprehensive overview of current knowledge will be of interest to advanced students, researchers and professionals in a wide range of disciplines"--Provided by publisher.

Nanomaterials Applications for Environmental Matrices: Water, Soil and Air takes a highly interdisciplinary approach in evaluating the use of a range of nanomaterials for various environmental applications, focusing, in particular, on their use in soil remediation, in improving water cleanliness, and in improving air quality. The book will not only help both materials scientists and environmental scientists understand the role played by nanomaterials in achieving these goals, but also give them practical ways they can be used to this end. Brings together the various applications and experimental aspects of nanoscience in the fields of chemistry, biology, environmental science and physics Maps the relationship between synthesis, properties and environmental interactions of nanomaterials, enabling greater understanding Describes new application opportunities for using nanomaterials in pollution trace detection and environmental improvement

This book is for chemical engineers, fuel technologists, agricultural engineers and chemists in the world-wide energy industry and in academic, research and government institutions. It provides a thorough review of, and entry to, the primary and review literature surrounding the subject. The authors are internationally recognised experts in their field and combine to provide both commercial relevance and academic rigour. Contributions are based on papers delivered to the Fifth International Conference sponsored by the IEA Bioenergy Agreement.

Biochar and its implementation as a renewable-based material is one of the topics on which the research community has focused the greatest energy in the last twenty years. This book provides readers with a scientific and technological overview of biochar, including new technologies for biochar production, new environmental and agronomic applications (e.g. biochar as growing media component or biochar application for mine land reclamation) and some emerging biochar applications in different fields (e.g. energy storage and catalysis). A special emphasis is placed on analyzing the links between the different stages of the value chain, underpinning the economic viability of biochar systems. Biochar as a Renewable-Based Material: With Applications in Agriculture, the Environment and Energy is designed as a textbook for graduate and postgraduate courses as well as a handbook for early-stage scientists, policy makers and potential technology customers. The book is written by internationally recognized scientists with a variety of complementary backgrounds.

A text to the advances and development of novel technologies in the production of high-value products from economically viable raw materials Lignocellulosic Biorefining Technologies is an essential guide to the most recent advances and developments of novel technologies in the production of various high-value products from economically viable raw materials. Written by a team of experts on the topic, the book covers important topics specifically on production of economical and sustainable products such as various biofuels, organic acids, enzymes, biopigments, biosurfactants, etc. The book highlights the important aspects of lignocellulosic biorefining including structure, function, and chemical composition of the plant cell wall and reviews the details about the various components present in the lignocellulosic biomass and

their characterizations. The authors explore the various approaches available for processing lignocellulosic biomass into second generation sugars and focus on the possibilities of utilization of lignocellulosic feedstocks for the production of biofuels and biochemicals. Each chapter includes a range of clear, informative tables and figures, and contains relevant references of published articles. This important text: Provides cutting-edge information on the recent developments in lignocellulose biorefinery Reviews production of various economically important and sustainable products, such as biofuels, organic acids, biopigments, and biosurfactants Highlights several broad-ranging areas of recent advances in the utilization of a variety of lignocellulosic feedstocks Provides a valuable, authoritative reference for anyone interested in the topic Written for post-graduate students and researchers in disciplines such as biotechnology, bioengineering, forestry, agriculture, and chemical industry, Lignocellulosic Biorefining Technologies is an authoritative and updated guide to the knowledge about various biorefining technologies.

The oil palm is the world's most valuable oil crop. Its production has increased over the decades, reaching 56 million tons in 2013, and it gives the highest yields per hectare of all oil crops. Remarkably, oil palm has remained profitable through periods of low prices. Demand for palm oil is also expanding, with the edible demand now complemented by added demand from biodiesel producers. The Oil Palm is the definitive reference work on this important crop. This fifth edition features new topics - including the conversion of palm oil to biodiesel, and discussions about the impacts of palm oil production on the environment and effects of climate change ? alongside comprehensively revised chapters, with updated references throughout. The Oil Palm, Fifth Edition will be useful to researchers, plantation and mill managers who wish to understand the science underlying recommended practices. It is an indispensable reference for agriculture students and all those working in the oil palm industry worldwide.

"This publication provides planners, decision-makers and engineers with guidelines to sustain irrigated agriculture and at the same time to protect water resources from the negative impacts of agricultural drainage water disposal. On the basis of case studies from Central Asia, Egypt, India, Pakistan and the United States of America, it distinguishes four broad groups of drainage water management options: water conservation, drainage water reuse, drainage water disposal and drainage water treatment."--P. [4] of cover.

The congress "Arsenic in the Environment" offers an international, multi- and interdisciplinary discussion platform for arsenic research aimed at short-term solutions of problems with considerable social impact, rather than only focusing on cutting edge and breakthrough research in physical, chemical, toxicological, medical and other specific issue

Soil Organic CarbonThe hidden potentialFood & Agriculture Org.

There is increasing attention to the importance of biodiversity for food security and nutrition, especially above-ground biodiversity such as plants and animals. However, less attention is being paid to the biodiversity beneath our feet, soil biodiversity, which drives many processes that produce food or purify soil and water. This report is the result of an inclusive process involving more than 300 scientists from around the world under the auspices of the FAO's Global Soil Partnership and its Intergovernmental Technical Panel on Soils, the Convention on Biological Diversity, the Global Soil Biodiversity Initiative, and the European Commission. It presents concisely the state of knowledge on soil biodiversity, the threats to it, and the solutions that soil biodiversity can provide to problems in different fields. It also represents a valuable

contribution to raising awareness of the importance of soil biodiversity and highlighting its role in finding solutions to today's global threats.

This publication provides practical guidelines on establishing composite service laboratories for the analysis of soil, plants, water and fertilisers (mineral, organic and biofertilisers). It also provides various analytical methods for assessing soil fertility and making nutrient recommendations, assessing quality of irrigation water, and details of the equipment, chemicals and glassware required for a given analytical capacity. Useful to administrators and planners in establishing laboratories, and to technicians through providing detailed and precise procedures for estimation.

Biomass is the most widely used non-fossil fuel in the world. Biomass resources show a considerable potential in the long-term given the increasing proliferation of dedicated energy crops for biofuels. The second edition of Biomass Gasification and Pyrolysis is enhanced with new topics, such as torrefaction and cofiring, making it a versatile resource that not only explains the basic principles of energy conversion systems, but also provides valuable insight into the design of biomass conversion systems. This book will allow professionals, such as engineers, scientists, and operating personnel of biomass gasification, pyrolysis or torrefaction plants, to gain a better comprehension of the basics of biomass conversion. The author provides many worked out design problems, step-by-step design procedures and real data on commercially operating systems. With a dedicated focus on the design, analysis, and operational aspects of biomass gasification, pyrolysis, and torrefaction, Biomass Gasification, Pyrolysis and Torrefaction, Second Edition offers comprehensive coverage of biomass in its gas, liquid, and solid states in a single easy-to-access source. Contains new and updated step-by-step process flow diagrams, design data and conversion charts, and numerical examples with solutions Includes chapters dedicated to evolving torrefaction technologies, practicing option of biomass cofiring, and biomass conversion economics Expanded coverage of syngas and other Fischer-Tropsch alternatives Spotlights advanced processes such as supercritical water gasification and torrefaction of biomass. Provides available research results in an easy-to-use design methodology

"The assessment builds on the work of the Livestock, Environment and Development (LEAD) Initiative"--Pref.

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