

## Comparison Between Thermal Hydrolysis And Enzymatic

**Food Waste to Valuable Resources: Applications and Management** compiles current information pertaining to food waste, placing particular emphasis on the themes of food waste management, biorefineries, valuable specialty products and technoeconomic analysis. Following its introduction, this book explores new valuable resource technologies, the bioeconomy, the technoeconomical evaluation of food-waste-based biorefineries, and the policies and regulations related to a food-waste-based economy. It is an ideal reference for researchers and industry professionals working in the areas of food waste valorization, food science and technology, food producers, policymakers and NGOs, environmental technologists, environmental engineers, and students studying environmental engineering, food science, and more. Presents recent advances, trends and challenges related to food waste valorization Contains invaluable knowledge on of food waste management, biorefineries, valuable specialty products and technoeconomic analysis Highlights modern advances and applications of food waste bioresources in various products' recovery

**Bioethanol Production from Food Crops: Sustainable Sources, Interventions and Challenges** comprehensively covers the global scenario of ethanol production from both food and non-food crops and other sources. The book guides readers through the balancing of the debate on food vs. fuel, giving important insights into resource management and the environmental and economic impact of this balance between demands. Sections cover Global Bioethanol from Food Crops and Forest Resource, Bioethanol from Bagasse and Lignocellulosic wastes, Bioethanol from algae, and Economics and Challenges, presenting a multidisciplinary approach to this complex topic. As biofuels continue to grow as a vital alternative energy source, it is imperative that the proper balance is reached between resource protection and human survival. This book provides important insights into achieving that balance. Presents technological interventions in ethanol production, from plant biomass, to food crops Addresses food security issues arising from bioethanol production Identifies development bottlenecks and areas where collaborative efforts can help develop more cost-effective technology

Undoubtedly the applications of polymers are rapidly evolving. Technology is continually changing and quickly advancing as polymers are needed to solve a variety of day-to-day challenges leading to improvements in quality of life. The **Encyclopedia of Polymer Applications** presents state-of-the-art research and development on the applications of polymers. This groundbreaking work provides important overviews to help stimulate further advancements in all areas of polymers. This comprehensive multi-volume reference includes articles contributed from a diverse and global team of renowned researchers. It offers a broad-based perspective on a multitude of topics in a variety of applications, as well as detailed research information, figures, tables, illustrations, and references. The encyclopedia provides introductions, classifications, properties, selection, types, technologies, shelf-life, recycling, testing and applications for each of the entries where applicable. It features critical content for both novices and experts including, engineers, scientists (polymer scientists, materials scientists, biomedical engineers, macromolecular chemists), researchers, and students, as well as interested readers in academia, industry, and research institutions.

This book introduces advanced or emerging technologies for conversion of wastes into a variety of high-value chemicals and materials. Energy and resources can be recovered from various residential, industrial and commercial wastes, such as municipal wastewater and sludge, e-waste, waste plastics and resins, crop residues, forestry residues and lignin. Advanced waste-to-resource and energy technologies like pyrolysis, hydrothermal liquefaction, fractionation, de-polymerization, gasification and carbonization are also introduced. The book serves as an essential guide to dealing with various types of wastes and the methods of disposal, recovery, recycling and re-use. As such it is a valuable resource for a wide readership, including graduate students, academic researchers, industrial researchers and practitioners in chemical engineering, waste management, waste to energy and resources conversion and biorefinery.

This book systematically introduces the key technologies for differentiated resourceful utilization of rural organic wastes based on high-efficiency anaerobic fermentation and bio-augmented composting, and discusses differentiating sources of organic wastes, integrating recycling technologies, developing key equipment, and researching management mechanisms. In addition, it describes the development of viable techniques and low-pollution, low-cost, and low-maintenance equipment. It also includes the technical specifications for the differentiated resourceful utilization of rural organic wastes and presents the energy-fertilizer integrated resourceful utilization method for rural organic wastes. Providing technological insights into improving the resourceful utilization level of rural organic wastes, this book is a valuable reference resource for administrative staff, researchers in the field of environmental protection, and technicians in enterprises involved in the treatment and disposal of solid wastes.

Intended for advanced students and practitioners of wastewater engineering, this text explains the theory and quantitative rationale for treating wastewater and industrial sludges, with public safety and efficiency in mind. It offers important information on various practices for safe and legal sludge disposal.

The use of plastic materials has seen a massive increase in recent years, and generation of plastic wastes has grown proportionately. Recycling of these wastes to reduce landfill disposal is problematic due to the wide variation in properties and chemical composition among the different types of plastics. Feedstock recycling is one of the alternatives available for consideration, and **Feedstock Recycling of Plastic Wastes** looks at the conversion of plastic wastes into valuable chemicals useful as fuels or raw materials. Looking at both scientific and technical aspects of the recycling developments, this book describes the alternatives available. Areas include chemical depolymerization, thermal processes, oxidation and hydrogenation. Besides conventional treatments, new technological approaches for the degradation of plastics, such as conversion under supercritical conditions and coprocessing with coal are discussed. This book is essential reading for those involved in plastic recycling, whether from an academic or industrial perspective. Consultants and government agencies will also find it immensely useful.

This two-volume work contains the papers presented at the 2016 International Conference on Civil, Architecture and Environmental Engineering (ICCAE 2016) that was held on 4-6 November 2016 in Taipei, Taiwan. The meeting was organized by China University of Technology and Taiwan Society of Construction Engineers and brought together

professors, researchers, scholars and industrial pioneers from all over the world. ICCAE 2016 is an important forum for the presentation of new research developments, exchange of ideas and experience and covers the following subject areas: Structural Science & Architecture Engineering, Building Materials & Materials Science, Construction Equipment & Mechanical Science, Environmental Science & Environmental Engineering, Computer Simulation & Computer and Electrical Engineering.

Issues in Biotechnology and Medical Technology Research and Application: 2013 Edition is a ScholarlyEditions™ book that delivers timely, authoritative, and comprehensive information about Biotechnology. The editors have built Issues in Biotechnology and Medical Technology Research and Application: 2013 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Biotechnology in this book to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Biotechnology and Medical Technology Research and Application: 2013 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

Thermal pretreatment systems are typically employed to improve waste-activated sludge (WAS) dewaterability and to treat sludge prior to anaerobic digestion. It is important to understand how WAS properties are affected during pretreatment to be able to assess the performances of processes utilizing pretreated WAS (PWAS). However, there are no generally accepted means of characterizing and comparing pretreatment processes. A pretreatment model for high temperature thermal hydrolysis was developed previously for one pretreatment condition. The motivation for this project stemmed from the need to extend the range of thermal pretreatment conditions to span the range of conditions commonly employed in practice and to evaluate the impact of these pretreatment conditions on WAS chemical oxygen demand (COD) fractionation. The two main objectives of this study were to fractionate the COD of WAS before and after pretreatment for several high temperature thermal pretreatment conditions and to compare the impact of pretreatment on aerobic and anaerobic biodegradability. The secondary objectives were to investigate how pretreatment affected the rate and extent of aerobic and anaerobic digestion of WAS. The data employed in this study was collected by others following the work of Staples-Burger (2012) and was generated by pretreatment of sludges at 125°C, 150°C, and 175°C for 10, 30 and 50 minutes. Physical and biochemical properties were measured for raw WAS (BR WAS) and PWAS. Offline and online respirometric data were used to evaluate the aerobic biodegradability of BR WAS and PWAS and to fractionate the COD of the BR WAS and PWAS. Biochemical methane potential (BMP) tests were conducted for BR WAS and PWAS to evaluate the anaerobic biodegradability of BR WAS and PWAS. BioWin® was used to aid in determining the WAS COD fractionation before and after pretreatment, and to determine whether pretreatment changed the aerobic and anaerobic biodegradability of the WAS. It was found that the high pressure thermal hydrolysis (HPTH) pretreatment conditions employed substantially solubilized the COD, organic nitrogen and volatile suspended solids (VSS) in the range of 30 - 55%, 23 - 41% and 30 - 89% respectively. Total COD (TCOD) was however not reduced by pretreatment indicating that organics were not mineralized. These findings closely agreed with the conclusions made in the literature. Pretreatment did not increase the overall extent to which WAS could be aerobically biodegraded. The fraction of non-biodegradable COD as represented by endogenous decay products (Ze) in the BR WAS were not converted to biodegradable form by pretreatment. However, pretreatment increased the rate at which WAS could be aerobically biodegraded as indicated by an increase in the fractions of readily biodegradable COD (S<sub>bsc</sub>) in the PWAS. Pretreatment increased both the rate and extent of anaerobic biodegradability. The ultimate methane yield and the methane production rate were both increased when compared to the ultimate methane yield and methane production rate observed in BMP tests conducted on BR WAS. The experimental results were combined with BioWin® modeling to determine that the BR WAS consisted of 79% Z<sub>bh</sub> and 18% endogenous decay products (Ze). The endogenous decay products fraction remained at 18% through pretreatment and the concentration of active biomass (Z<sub>bh</sub>) in PWAS was deemed to be negligible. HPTH pretreatment at the employed temperatures and durations transformed the biodegradable fraction of BR WAS (Z<sub>bh</sub>) to 16.5 - 34.6% S<sub>bsc</sub> and 45.8 - 63.6% slowly biodegradable COD (X<sub>sp</sub>) of the TCOD concentration. The same PWAS COD fractionations were employed in anaerobic biodegradability test modeling and it was concluded that the aerobic and anaerobic biodegradability of PWAS was different. Up to 50% of the endogenous decay products were converted to biodegradable substrate (X<sub>sp</sub>) due to HPTH pretreatment. It was determined that both pretreatment temperature and duration were important in solubilizing organic matter in the WAS. Increasing the pretreatment temperature and duration generally increased the organics solubilization. However, the impact of pretreatment temperature and duration on WAS COD fractions were inconclusive. The increase in organics solubilization did not correspond to how much of the biodegradable COD of BR WAS was converted to S<sub>bsc</sub> by pretreatment.

Protein plays a critical role in human nutrition. Although animal-derived proteins constitute the majority of the protein we consume, plant-derived proteins can satisfy the same requirement with less environmental impact. Sustainable Protein Sources allows readers to understand how alternative proteins such as plant, fungal, algal, and insect protein can take the place of more costly and less efficient animal-based sources. Sustainable Protein Sources presents the various benefits of plant and alternative protein consumption, including those that benefit the environment, population, and consumer trends. The book presents chapter-by-chapter coverage of protein from various sources, including cereals and legumes, oilseeds, pseudocereals, fungi, algae, and insects. It assesses the nutrition, uses, functions, benefits, and challenges of each of these proteins. The book also explores opportunities to improve utilization and addresses everything from ways in which to increase consumer acceptability, to methods of improving the taste of

products containing these proteins, to the ways in which policies can affect the use of plant-derived proteins. In addition, the book delves into food security and political issues which affect the type of crops that are cultivated and the sources of food proteins. The book concludes with required consumer choices such as dietary changes and future research ideas that necessitate vigorous debate for a sustainable planet. Introduces the need to shift current animal-derived protein sources to those that are more plant-based Presents a valuable compendium on plant and alternate protein sources covering land, water, and energy uses for each type of protein source Discusses nutritive values of each protein source and compares each alternate protein to more complete proteins Provides an overview of production, including processing, protein isolation, use cases, and functionality Presents solutions to challenges, along with taste modulation Focuses on non-animal derived proteins Identifies paths and choices that require consumer and policymaker debate and action

Sustainable Resource Management Learn how current technologies can be used to recover and reuse waste products to reduce environmental damage and pollution In this two-volume set, Sustainable Resource Management: Technologies for Recovery and Reuse of Energy and Waste Materials delivers a compelling argument for the importance of the widespread adoption of a holistic approach to enhanced water, energy, and waste management practices. Increased population and economic growth, urbanization, and industrialization have put sustained pressure on the world's environment, and this book demonstrates how to use organics, nutrients, and thermal heat to better manage wastewater and solid waste to deal with that reality. The book discusses basic scientific principles and recent technological advances in current strategies for resource recovery from waste products. It also presents solutions to pressing problems associated with energy production during waste management and treatment, as well as the health impacts created by improper waste disposal and pollution. Finally, the book discusses the potential and feasibility of turning waste products into resources. Readers will also enjoy: A thorough introduction and overview to resource recovery and reuse for sustainable futures An exploration of hydrothermal liquefaction of food waste, including the technology's use as a potential resource recovery strategy A treatment of resource recovery and recycling from livestock manure, including the current state of the technology and future prospects and challenges A discussion of the removal and recovery of nutrients using low-cost adsorbents from single-component and multi-component adsorption systems Perfect for water and environmental chemists, engineers, biotechnologists, and food chemists, Sustainable Resource Management also belongs on the bookshelves of environmental officers and consultants, chemists in private industry, and graduate students taking programs in environmental engineering, ecology, or other sustainability related fields.

This book presents investigation results of thermal transformations in thermoresistant polymers: polysulfones, polyester-imides, aliphatic-aromatic polyimides and polyamides, liquid-crystal aromatic co-polyesters, polyphenylquinoxalines at temperatures of materials and articles processing and operation. An important result of investigations is the determination of thermooxidative degradation regularities for aliphatic-aromatic heterochain polymers and description of the degradation mechanism. The applied aspect of this work is the approach to stabilization of thermoresistant polymers and composite materials derived from them using additives and analysis of the mechanism of high-temperature inhibited oxidation. The book presents results which have been obtained through many years of research until recently, mostly obtained by scientists of G.S. Petrov Research Institute of Polymeric Materials (Moscow, Russia) – one of the leading Institutes in this branch - which have not been available in international scientific publications before.

Advances in Food and Nutrition Research, Volume 87 provides updated information on nutrients in foods and how to avoid deficiency, especially the essential nutrients that should be present in the diet to reduce disease risk and optimize health. The book provides the latest advances on the identification and characterization of emerging bioactive compounds with putative health benefits. Chapters in this new release include discussions of the function and application of bioactive peptides from corn gluten meal, Dietary fatty acids and metabolic syndrome, the Microbial ecology of plant-based fermented foods and current knowledge on their impact on human health, and much more. Presents contributions and the expertise and reputation of leaders in nutrition Includes updated, in-depth, critical discussions of available information, giving readers a unique opportunity to learn Provides high-quality illustrations (with a high percentage in color) that give additional value

Each chapter has three types of learning aides for students: open-ended questions, multiple-choice questions, and quantitative problems. There is an average of about 50 per chapter. There are also a number of worked examples in the chapters, averaging over 5 per chapter, and almost 600 photos and line drawings.

Advances in Molecular Toxicology features the latest advances in all of the subspecialties of the broad area of molecular toxicology. Toxicology is the study of poisons, and this series details the study of the molecular basis by which a vast array of agents encountered in the human environment and produced by the human body itself manifest themselves as toxins. Not strictly limited to documenting these examples, the series is also concerned with the complex web of chemical and biological events that give rise to toxin-induced symptoms and disease. The new technologies that are being harnessed to analyze and understand these events will also be reviewed by leading workers in the field. Advances in Molecular Toxicology will report progress in all aspects of these rapidly evolving molecular aspects of toxicology with a view toward detailed elucidation of both progress on the molecular level and on advances in technological approaches employed. Cutting-edge reviews by leading workers in the discipline In-depth dissection of molecular aspects of interest to a broad range of scientists, physicians and any student in the allied disciplines Leading edge applications of technological innovations in chemistry, biochemistry and molecular medicine

Soybean allergy affects approximately 0.4% of children worldwide. At least 16 proteins in soybean bind IgE from some soybean allergic subjects. Although the relative allergenic

importance and abundance of individual proteins in soybean varieties is not understood, the allergenicity assessment guideline for the safety of genetically modified (GM) food crops (Codex, 2003) includes assessing potential increases in expression of endogenous allergens in an allergenic crop like soybeans that might be due to insertion of the new DNA. The studies described in this dissertation included comparison of binding of IgE from individual soybean allergic subjects to proteins in three transgenic soybean lines, their respective near-isogenic and other commercial lines. The results indicated no evidence that the transgenic soybean lines present an increased risk for soybean allergic subjects especially since those with soybean allergy should avoid all soybeans. Furthermore, based on the observed variation among commercial lines, it is not clear that similar tests are useful to evaluate food safety for typical GM varieties. Soybean products are widely used in food because of their functionality, nutritional properties and low cost. Some soybean ingredients are processed either by heat treatment or enzymatic hydrolysis to attain desirable functional properties or in some cases to reduce the allergenicity. However, few studies have investigated the effect various processing conditions have on allergenicity of soybean products and their efficacy in reducing allergenicity of soybean. Additional studies described in this dissertation evaluated potential changes in IgE binding to soybean proteins that are heat-treated under conditions that mimic some commercial processing or undergo enzyme hydrolysis. Results indicated that majority of thermal treatment conditions utilized in making soybean products will not affect their allergenicity and hydrolysis of soybean proteins by different enzymes does not make them less allergenic compared to the untreated proteins and may increase their allergenicity.

oCompilation and evaluation of the newest applications of chromatography for food science and technology  
oEnumeration of chromatographic methods and critical discussion of results  
This book presents a unique collection of up-to-date chromatographic methods for the separation and quantitative determination of carbohydrates, lipids, proteins, peptides, amino acids, vitamins, aroma and flavor compounds in a wide variety of foods and food products. Chromatography in Food Science and Technology presents a concise evaluation of existing chromatographic methods used for many food and food product macro and microcomponents. Chromatographic methods are compiled according to the character of the food components to be separated. The book's chapters deal separately with the different classes of food components, presenting both gas and liquid chromatographic methods used for their determination, and discussing the advantages and disadvantages of each. Unlike other references, Chromatography in Food Science and Technology is entirely devoted to the use of chromatography for food analysis, and focuses on practical, food-related examples. It treats the theoretical aspects of chromatography briefly, to the degree that the information helps the use and development of new analytical methods for the separation of any kind of food components.

This book presents the dynamic role of algae in a sustainable environment. Two major aspects, namely bioenergy and bioremediation, have been elaborated in various chapter contributed by scientists and teachers from different geographical areas throughout the world. Algal biofuels is an emerging area of equal interest to researchers, industries, and policy makers working or focusing on alternative (i.e. renewable) fuels. Algae have been an area of interest due to their wide range of applications. Over the last 5 decades, eukaryotic algae have been used in the aquaculture industry as feed for invertebrates, providing a rich source of antioxidants, dietary fiber, minerals and protein. More recently, there has been a focus on the use of algal biomass in the development of alternative fuels. The extraction of oil from algae has been widely explored as a much more viable feedstock than plant-based oils in large-scale fuel production. Using algae as feedstock has the advantages that it doesn't require arable land and that wastewater can be used as a source of nutrients in their culture. The multifunctional approach of algae includes pollution remediation, carbon sequestration, biofuels production, and delivery of value-added products. However, there are still some obstacles that need to be overcome to make their use as potential feedstock for biofuels techno-economically feasible. In order to maintain the sustainability aspect of algal biofuels, various aspects have to be studied and critically analyzed to assess the long-term sustainability of algal derived biofuels. This book discusses the role of algae as a promising future feedstock for biofuels. They are known to sequester carbon in much larger amounts than plants and as such the book also describes their phycoremediation potential for conventional as well as emerging contaminants. It describes the role of anaerobic digestion in algal biorefineries; bioreactions and process parameters; biogas recovery and reuse. The role of algal biofilm based technology in wastewater treatment and transforming waste into bio-products is discussed, and remediation of sewage water through algae is assessed. The book also describes the production of biohydrogen, bio-oil, biodiesel; and the major bottlenecks in their usage. The emerging characterization techniques of these biofuels (bio-oil and biodiesel) are described, as are the decolorizing potential of algae and the genetic engineering techniques that could enhance the production of lipids in algae. Other aspects of the book include the role of remote sensing technology in the monitoring of algae and a life cycle assessment of algal biofuels.

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Contamination of foods and agricultural commodities by various types of toxigenic fungi is a concerning issue for human and animal health. Moulds naturally present in foods can produce mycotoxins and contaminate foodstuffs under favourable conditions of temperature, relative humidity, pH, and nutrient availability. Mycotoxins are, in general, stable molecules that are difficult to remove from foods once they have been produced. Therefore, the prevention of mycotoxin contamination is one of the main goals of the agriculture and food industries. Chemical control or decontamination techniques may be quite efficient; however, the more sustainable and restricted use of fungicides, the lack of efficiency in some foods, and the consumer demand for chemical-residue-free foods require new approaches to control this hazard. Therefore, food safety demands continued research efforts for exploring new strategies to reduce mycotoxin contamination. This Special Issue contains original contributions and reviews that advance the knowledge about the most current promising approaches to minimize mycotoxin contamination, including biological control agents, phytochemical antifungal compounds, enzyme detoxification, and the use of novel technologies.

A compilation of 58 carefully selected, topical articles from the Ullmann's Encyclopedia of Industrial Chemistry, this three-volume handbook provides a wealth of information on economically important basic foodstuffs, raw materials, additives, and processed foods, including a section on animal feed. It brings together the chemical and physical characteristics, production processes and production figures, main uses, toxicology and safety information in one single resource. More than 40 % of the content has been added or updated since publication of the 7th edition of

the Encyclopedia in 2011 and is available here in print for the first time. The result is a "best of Ullmann's", bringing the vast knowledge to the desks of professionals in the food and feed industries.

The recent explosion of interdisciplinary research has fragmented the knowledge base surrounding renewable polymers. The Chemistry of Bio-based Polymers 2nd edition brings together, in one volume, the research and work of Professor Johannes Fink, focusing on biopolymers that can be synthesized from renewable polymers. After introducing general aspects of the field, the book's subsequent chapters examine the chemistry of biodegradable polymeric types sorted by their chemical compounds, including the synthesis of low molecular compounds. Various categories of biopolymers are detailed including vinyl-based polymers, acid and lactone polymers, ester and amide polymers, carbohydrate-related polymers and others. Procedures for the preparation of biopolymers and biodegradable nanocomposites are arranged by chemical methods and in vitro biological methods, with discussion of the issue of "plastics from bacteria." The factors influencing the degradation and biodegradation of polymers used in food packaging, exposed to various environments, are detailed at length. The book covers the medical applications of bio-based polymers, concentrating on controlled drug delivery, temporary prostheses, and scaffolds for tissue engineering. Professor Fink also addresses renewable resources for fabricating biofuels and argues for localized biorefineries, as biomass feedstocks are more efficiently handled locally.

Biohydrogen Production and Hybrid Process Development: Energy and Resource Recovery from Food Waste explores the production of biohydrogen from food waste via anaerobic fermentation, focusing on effect factors, control methods and optimization. The book introduces food waste treatment and disposal technologies, including operational principles and process control. The authors discuss the use of aged refuse, the effect of several key factors on anaerobic gas production rate, process parameters optimization for enhancing biohydrogen yield, key factors in biohydrogen production from sewage sludge fermentation, and new developments in nutrition recovery from food waste. This book spans the entire production cycle, from waste recovery to its conversion processes, end-product, and by-product utilization, providing engineering researchers, PhD students, and industry practitioners in the field of biohydrogen production, biogas production, biomass conversion, and food waste management with a thorough background on the production of hydrogen via anaerobic fermentation. Covers the fundamentals and applications of the use of food waste for biohydrogen production through anaerobic digestion Explores core challenges of biohydrogen production operations, including details on process optimization and control, and multiple case studies grounded in current industrial practice Includes methodological perspectives comparing and contrasting approaches to biohydrogen production using anaerobic digestion with optimization techniques for production efficiency

Anaerobic biotechnology is a cost-effective and sustainable means of treating waste and wastewaters that couples treatment processes with the reclamation of useful by-products and renewable biofuels. This means of treating municipal, agricultural, and industrial wastes allows waste products to be converted to value-added products such as biofuels, biofertilizers, and other chemicals. Anaerobic Biotechnology for Bioenergy Production: Principles and Applications provides the reader with basic principles of anaerobic processes alongside practical uses of anaerobic biotechnology options. This book will be a valuable reference to any professional currently considering or working with anaerobic biotechnology options.

Hydrocarbons—Advances in Research and Application: 2012 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Hydrocarbons. The editors have built Hydrocarbons—Advances in Research and Application: 2012 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Hydrocarbons in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Hydrocarbons—Advances in Research and Application: 2012 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

Recent advances in technology to recover bioenergy from various feedstocks make them suitable alternatives to fossil fuel. This book contains several scientific discussions regarding microbes involved in biogas production, the anaerobic digestion process, their operation, and application for sustainable development. The book provides in-depth information about anaerobic digestion for researchers and graduate students. The editor sincerely thanks all the contributors, whose efforts have brought this book to fruition.

Thermal hydrolysis is revolutionizing wastewater treatment. Current treatment methods have evolved little since pioneering work in the late 19th and early 20th centuries. Subsequently, most wastewater treatment plants are not designed to meet modern drivers such as energy conservation and nutrient recovery. Additionally, sludge management is expensive and often not viewed in high regard by external stakeholders. By changing the properties of sewage sludge, thermal hydrolysis allows wastewater treatment works to become more efficient, enabling the treatment of greater flowrates to higher standards. Production of renewable energy from sludge is increased, whilst quantity of treated material reduced, which further decreases processing requirements and costs regardless of what they may be. This book, aimed at students and practitioners alike, describes the development of the technology, and highlights the design and economics by means of examples. Benefits and challenges related to thermal hydrolysis are also characterized alongside selected case-studies and ideas for future applications. Dr William (Bill) Barber has had a keen interest in thermal hydrolysis for numerous years and was instrumental in the development of Europe's largest facility as well as advising water utilities, consultants, researchers and government organizations on its potential to modernize wastewater treatment.

This book celebrates the life, work and influence of Professor Roger W.H. Sargent of Imperial College London. It does so through a range of original contributions that span the wide academic and industry interests of Professor Sargent. Roger Sargent passed away in late 2018, but his legacy lives on through his enormous academic tree, which traces to

the early 1960s. That huge body of work has also had significant impacts on industrial practices. Roger was regarded as “the father of Process Systems Engineering (PSE)”. This area of Chemical Engineering continues to influence the modelling, design, control, optimization and integrated performance of industrial and related processes. This book highlights some of those impacts and the ongoing importance of PSE in helping to solve some of the grand challenges of our time.

Food security, crop protection, biodiversity, and human and environmental health are among the main needs and concerns of society. Modern biotechnology and life sciences represent a constantly evolving area that is key for the rational use of natural resources – resources that in turn are indispensable for societal development. This book features the outcomes of the IV International Biotechnology and Biodiversity Congress, held in Guayaquil, Ecuador, 2018. It includes extensive reviews of the trends in agricultural and forestry biotechnology, molecules and materials biodiscovery, ethnomedicine, environmental impact and bioindustry research, describing many of these topics from the Latin America perspective and showing how the biodiversity and ancient knowledge of these countries are vital for worldwide sustainable development.

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