

Anaerobic Biotechnology For Industrial Wastewaters

Environmental protection and resource recovery are two crucial issues facing our society in the 21st century. Anaerobic biotechnology has become widely accepted by the wastewater industry as the better alternative to the more conventional but costly aerobic process and tens of thousands of full-scale facilities using this technology have been installed worldwide in the past two decades. Anaerobic Biotechnology is the sequel to the well-received Environmental Anaerobic Technology: Applications and New Developments (2010) and compiles developments over the past five years. This volume contains contributions from 48 renowned experts from across the world, including Gatzke Lettinga, laureate of the 2007 Tyler Prize and the 2009 Lee Kuan Yew Water Prize, and Perry McCarty, whose pioneering work laid the foundations for today's anaerobic biotechnology. This book is ideal for engineers and scientists working in the field, as well as decision-makers on energy and environmental policies.

Sustainable Water and Wastewater Processing covers the 12 most current topics in the field of sustainable water processing, with emphasis given to water as a resource (quality, supply, distribution, and aquifer recharge). Topics covered include emerging sustainable technologies for potable and wastewater treatment, water reuse and recycling, advanced membrane processes, desalination technologies, integrated and hybrid technologies, process modeling, advanced oxidative and catalytic processes, environmentally, economically and socially sustainable technology for water treatment, industrial water treatment, reuse and recovery of materials, and emerging nanotechnology and biotechnology for water processing. Responding to the goals of sustainability requires the maximum utilization of all water resources, water processing with restricted energy costs and reduced greenhouse gas production. Following these trends, this book covers all the important aspects of sustainable water processing and support. Covers cutting-edge topics of water process engineering, sustainability and energy efficiency Fills the transfer knowledge gap between academia and industry by analyzing the associated environmental, economic and sustainability challenges of water processing Includes theoretical and applied research and technological and industrial solutions for sustainable, economic and large scale water treatment, recycling and reutilization Analyzes potentiality and economic feasibility of already commercialized processes

Anaerobic Biotechnology for Industrial WastewatersAnaerobic BiotechnologyEnvironmental Protection and Resource RecoveryWorld Scientific

Technical information for using activated sludge to treat effluents from multiple industries Covers virtually all traditional and advanced methods, as well as treatability and process modeling New methods for removing U.S. and European regulated microconstituents, trace organics, active pharmaceutical ingredients and other contaminants Explains advances in water reuse and plant retrofitting Useful for in-house training This comprehensive book presents critical information on the applications of activated sludge for treating industrial wastewaters, as well as other effluents that impact POTWs. The book offers details on how advances in activated sludge can be deployed to meet more stringent discharge limits by explaining many novel variations of activated sludge and offering technical guidance on process modeling and optimization. Special attention is given to emerging contaminants and water reuse strategies. Case studies are drawn from the pharma, food and shale gas industries. Based on short courses taught by the authors, as well as hundreds of hours of in-plant consulting, this book offers the tools to understand and modify the activated sludge process for superior and sustainable wastewater treatment. From the Authors' Preface: "After speaking with practitioners, operators and engineers, the authors felt a new text was needed...to cover the following developments: "the continued evolution of the activated sludge process and its numerous designs, configurations and technology developments;"design of industrial water reuse systems...to achieve industry sustainability goals;"changes...from BOD, TSS and nutrient removal to removal of specific organics, toxicity...microconstituents, and more stringent effluent permit limits;"advances in process modeling tools that can be used in combination with treatability testing tools for plant design, optimization and troubleshooting;"concerns over industrial wastewater discharge impacts to POTWs, such as nitrification inhibition, the impact of frac water...and the fate of microconstituents through POTWs."

Proceedings of the 52nd Purdue Industrial Waste Conference1997 Conference

Activated Sludge Technologies for Treating Industrial Wastewaters

Wastewater Treatment and Reuse, Theory and Design Examples, Volume 1

Selected Water Resources Abstracts

Anaerobic Digestion Processes in Industrial Wastewater Treatment

Anaerobic technology has become widely accepted by the environmental industry as a cost-effective alternative to the conventional aerobic process. This makes anaerobic process the favored green treatment technology for sustainable environment in years to come. Written by world-renowned authors, this compendium summarizes the successful full-scale application experiences of anaerobic technology worldwide, including not just food, beverage, and distillery wastewaters but also municipal, agricultural, chemical and petrochemical wastewaters. The book also introduces new developments of anaerobic technology, including pretreatment and granulation technologies, membrane bioreactor, two-stage treatment, bio-hydrogen production, molecular techniques, and modeling .

This book examines the practices used or considered for biological treatment of water/waste-water and hazardous wastes. The technologies described involve conventional treatment processes, their variations, as well as future technologies found in current research. The book is intended for those seeking an overview to the biotechnological aspects of pollution engineering, and covers the major topics in this field. The book is divided into five major sections and references are provided for those who wish to dig deeper.

Biotechnology is a collection of technologies that capitalize on the attributes of cells and biological molecules. Biotechnology will help improve the ability to customise therapies based on individual genomics; prevent, diagnose, and treat all types of diseases rather than rely on rescue therapy and provide breakthroughs in agricultural production and food safety. This book offers new research in this growing field.

New and timely research, methods, and processes are described in 92 technical papers. This new volume in the Purdue series presents a compendium of valuable information that can be directly applied to today's big problems of environmental control, treatment, regulation, and compliance.

Current Developments in Biotechnology and Bioengineering

Advanced Biological Treatment Processes for Industrial Wastewaters

Biotechnology for Waste and Wastewater Treatment

Wastewater Treatment

Environmental Anaerobic Technology

This book will present the theory involved in wastewater treatment processes, define the important design parameters involved, and provide typical values of these parameters for ready reference; and also provide numerical applications and step-by-step calculation procedures in solved examples. These examples and solutions will help enhance the readers' comprehension and deeper understanding of the basic concepts, and can be applied by plant designers to design various components of the treatment facilities. It will also examine the actual calculation steps in numerical examples, focusing on practical application of theory and principles into process and water treatment facility design.

This book presents advanced techniques for wastewater treatment and the chapters review the environmental impact of water pollution, the analysis of water quality, and technologies for the preservation of water resources. Also outlined in this volume is the bioremediation of heavy metals, dyes, bisphenols, phthalates, cyanobacteria in contaminated water and wastewater.

Another focus of this book is the use of natural remediation techniques such as bacterial biofilms and enzymes.

There have been many significant microbiological, biochemical and technological advances made in the understanding and implementation of anaerobic digestion processes with respect to industrial and domestic wastewater treatment. Elucidation of the mechanisms of anaerobic degradation has permitted a greater control over the biological parameters of waste conversion and the technical advances achieved have reduced the time and land area requirements and increased the cost-effectiveness and efficiency of the various processes presently in use. By product recovery in the form of utilisable methane gas has become increasingly feasible, while the development of new and superior anaerobic reactor designs with increased tolerance to toxic and shock loadings of concentrated effluents has established a potential for treating many extremely recalcitrant industrial wastestreams. The major anaerobic bioreactor systems and their applications and limitations are examined here, together with microbiological and biochemical aspects of anaerobic wastewater treatment processes. London, June 1986 S. M. Stronach T. Rudd J. N. Lester v Table of Contents 1 The Biochemistry of Anaerobic Digestion 1 1. 1 Kinetics of Substrate Utilisation and Bacterial Growth 3 1. 1. 1 COD Fluxes and Mean Carbon Oxidation State 3 1. 1. 2 Bacterial Growth and Biokinetics 4 1. 1. 2. 1 Growth and Single Substrate Kinetics 4 1. 1. 2. 2 Multisubstrate Systems . 8 1. 2 Kinetics and Biochemistry of Hydrolysis 8 1. 3 Kinetics and Biochemistry of Fermentation and H₂-Oxidation . 11 1.

The anaerobic process is considered to be a sustainable technology for organic waste treatment mainly due to its lower energy consumption and production of residual solids coupled with the prospect of energy recovery from the biogas generated. However, the anaerobic process cannot be seen as providing the 'complete' solution as its treated effluents would typically not meet the desired discharge limits in terms of residual carbon, nutrients and pathogens. This has given impetus to subsequent post treatment in order to meet the environmental legislations and protect the receiving water bodies and environment. This book discusses anaerobic treatment from the perspective of organic wastes and wastewaters (municipal and industrial) followed by various post-treatment options for anaerobic effluent polishing and resource recovery. Coverage will also be from the perspective of future trends and thoughts on anaerobic technologies being able to support meeting the increasingly stringent disposal standards. The resource recovery angle is particularly interesting as this can arguably help achieve the circular economy. It is intended the information can be used to identify appropriate solutions for anaerobic effluent treatment and possible alternative approaches to the commonly applied post-treatment techniques. The succeeding discussion is intended to lead on to identification of opportunities for further research and development. This book can be used as a standard reference book and textbook in universities for Master and Doctoral students. The academic community relevant to the subject, namely faculty, researchers, scientists, and practicing engineers, will find the book both informative and as a useful source of successful case studies.

Waste Water

Environmental Protection and Resource Recovery

Concepts and Applications

Principles and Applications

The past 30 years have seen the emergence of a growing desire worldwide that positive actions be taken to restore and protect the environment from the degrading effects of all forms of pollution – air, water, soil, and noise. Since pollution is a direct or indirect consequence of waste production, the seemingly idealistic demand for "zero discharge" can be construed as an unrealistic demand for zero waste. However, as long as waste continues to exist, we can only attempt to abate the subsequent pollution by converting it to a less noxious form. Three major questions usually arise when a particular type of pollution has been identified: (1) How serious is the pollution? (2) Is the technology to abate it available? and (3) Do the costs of abatement justify the degree of abatement achieved? This book is one of the volumes of the Handbook of Environmental Engineering series. The principal intention of this series is to help readers formulate answers to the above three questions. The traditional approach of applying tried-and-true solutions to specific pollution problems has been a major contributing factor to the success of environmental engineering, and has accounted in large measure for the establishment of a "methodology of pollution control." However, the realization of the ever-increasing complexity and interrelated nature of current environmental problems renders it imperative that intelligent planning of pollution abatement systems be undertaken.

Instrumentation, control and automation (ICA) in wastewater treatment systems is now an established and recognised area of technology in the profession. There are obvious incentives for ICA, not the least from an economic point of view. Plants are also becoming increasingly complex which necessitates automation and control. Instrumentation, Control and Automation in Wastewater Systems summarizes the state-of-the-art of ICA and its application in wastewater treatment systems and focuses on how leading-edge technology is used for better operation. The book is written for: The practising process engineer and the operator, who wishes to get an updated picture of what is possible to implement in terms of ICA; The process designer, who needs to consider the couplings between design and operation; The researcher or the student, who wishes to get the latest technological overview of an increasingly complex field. There is a clear aim to present a practical ICA approach, based on a technical and economic platform. The economic benefit of different control and operation possibilities is quantified. The more qualitative benefits, such as better process understanding and more challenging work for the operator are also described. Several full-scale experiences of how ICA has improved economy, ease of operation and robustness of plant operation are presented. The book emphasizes both unit process control and plant wide operation. Scientific & Technical Report No. 15

Anaerobic digestion is a biochemical degradation process that converts complex organic material, such as animal manure, into methane and other byproducts. Part of the author's Wastewater Microbiology series, Microbiology of Anaerobic Digesters eschews technical jargon to deliver a practical, how-to guide for wastewater plant operators.

A deeper insight into the complex processes involved in this field, covering the biological, chemical and engineering fundamentals needed to further develop effective methodologies. The book devotes detailed chapters to each of the four main areas of environmental biotechnology -- wastewater treatment, soil treatment, solid waste treatment, and waste gas treatment -- dealing with both the microbiological and process engineering aspects. The result is the combined knowledge contained in the extremely successful volumes 11a through 11c of the "Biotechnology" series in a handy and compact form.

Case Studies

Biotechnology in Industrial Waste Treatment and Bioremediation

Principles and Basic Treatment

Applications and New Developments

Methods for Bioremediation of Water and Wastewater Pollution

The first edition of this book was published in 2008 and it went on to become IWA Publishing's bestseller. Clearly there was a need for it because over the twenty years prior to 2008, the knowledge and understanding of wastewater treatment had advanced extensively and moved away from empirically-based approaches to a fundamental first-principles approach based on chemistry, microbiology, physical and bioprocess engineering, mathematics and modelling. However the quantity, complexity and diversity of these new developments was overwhelming for young water professionals, particularly in developing countries without readily available access to advanced-level tertiary education courses in wastewater treatment. For a whole new generation of young scientists and engineers entering the wastewater treatment profession, this book assembled and integrated the postgraduate course material of a dozen or so professors from research groups around the world who have made significant contributions to the advances in wastewater treatment. This material had matured to the degree that it had been codified into mathematical models for simulation with computers. The first edition of the book offered, that upon completion of an in-depth study of its contents, the modern approach of modelling and simulation in wastewater treatment plant design and operation could be embraced with deeper insight, advanced knowledge and greater confidence, be it activated sludge, biological nitrogen and phosphorus removal, secondary settling tanks, or biofilm systems. However, the advances and developments in wastewater treatment have accelerated over the past 12 years since publication of the first edition. While all the chapters of the first edition have been updated to accommodate these advances and developments, some, such as granular sludge, membrane bioreactors, sulphur conversion-based bioprocesses and biofilm reactors which were new in 2008, have matured into new industry approaches and are also now included in this second edition. The target readership of this second edition remains the young water professionals, who will still be active in the field of protecting our precious water resources long after the aging professors who are leading some of these advances have retired. The authors, all still active in the field, are aware that cleaning dirty water has become more complex but that it is even more urgent now than 12 years ago, and offer this second edition to help the young water professionals engage with the scientific and bioprocess engineering principles of wastewater treatment science and technology with deeper insight, advanced knowledge and greater confidence built on stronger competence.

Anaerobic digestion of biomass to biogas, commonly occurring in natural anoxic ecosystems, is an excellent method for utilizing wastes and producing green energy. This book presents examples of local installations of AD, or their proposals, located at small factories, workplaces, and in rural areas and housing complexes. The facilities consider the specific nature of the region, site conditions, and specificity of the utilized wastes. They protect the environment and ensure dispersed energy production. The latter is of great economic significance due to its closeness to end customers. Small local installations expand the pool of renewable energy on a global scale.

This book review series presents current trends in modern biotechnology. The aim is to cover all aspects of this interdisciplinary technology where knowledge, methods and expertise are required from chemistry, biochemistry, microbiology, genetics, chemical engineering and computer science. Volumes are organized topically and provide a comprehensive discussion of developments in the respective field over the past 3-5 years. The series also discusses new discoveries and applications. Special volumes are dedicated to selected topics which focus on new biotechnological products and new processes for their synthesis and purification. In general, special volumes are edited by well-known guest editors. The series editor and publisher will however always be pleased to receive suggestions and supplementary information. Manuscripts are accepted in English.

Currently in the US, agro-industrial wastes are, for the most part, treated and disposed of off-site at municipal treatment plants and landfills, imposing a burden on municipalities and the environment. Anaerobic pre-treatment of these wastes has long been known to be an effective and environmentally sustainable biotechnology, as biogas is generated in the process and the volume of biosolids is significantly reduced in comparison to aerobic treatment. This biotechnology is widely distributed internationally but less so in the US. This thesis sets forth relevant principles of the biotechnology, evaluates some cases where it is currently adopted in the US, and provides conceptual reactor designs for two case studies. In both cases, biogas yield, solids reduction and organic loading reduction were found to be significant, but economic returns were modest. For the first case study, a meat packing plant, wastewater flow and characteristics data were obtained and analyzed, and an upflow anaerobic sludge blanket reactor design was prepared. For the second case study, a dairy ranch, reactor design results were compared with AgSTAR spreadsheet models available from the USEPA. In order to evaluate the potential to implement this biotechnology throughout agro-industry in Kansas, data was independently gathered, using specific protocols to ensure accuracy and relevance, which allowed the statewide median flow and organic loading parameters from agro-industry to be estimated. A model was developed to estimate biogas potential from flow and TSS, both of which are required NPDES reporting parameters. The estimated biogas yield for the two case studies was consistent with model results. The model results indicate that, if anaerobic wastewater pre-treatment were fully adopted in Kansas agro-industry, a median estimate of 19,800 MMBtu of biogas (methane) could be generated, equivalent to the natural gas demand of about 500 homes. The quantity of biosolids diverted from publicly owned treatment works would be 1,000 - 1,200 tonnes/year. The median BOD₅ received from agro-industrial users would be reduced from 1,500 to 420 mg/L. However, a survey of industrial pre-treatment coordinators at agencies receiving agro-industrial wastewater found somewhat unfavorable attitudes towards using anaerobic wastewater pre-treatment. Recommendations for future research and engagement activities are provided.

A Practical Handbook

Fundamentals of Wastewater Treatment and Engineering

Biological Treatment of Industrial Effluents

Design of Anaerobic Processes for Treatment of Industrial and Municipal Waste, Volume VII

Post Treatments of Anaerobically Treated Effluents

Principles, methods, and calculations for evaluating, designing and operating anaerobic systems

The 2nd edition of Fundamentals of Wastewater Treatment and Design introduces readers to the fundamental concepts of wastewater treatment, followed by engineering design of unit processes for

sustainable treatment of municipal wastewater and resource recovery. It has been completely updated with new chapters to reflect current advances in design, resource recovery practices and research. Another highlight is the addition of the last chapter, which provides a culminating design experience of both urban and rural wastewater treatment systems. Filling the need for a textbook focused on wastewater, it covers history, current practices, emerging concerns, future directions and pertinent regulations that have shaped the objectives of this important area of engineering. Basic principles of reaction kinetics, reactor design and environmental microbiology are introduced along with natural purification processes. It also details the design of unit processes for primary, secondary and advanced treatment, as well as solids processing and removal. Recovery of water, energy and nutrients are explained with the help of process concepts and design applications. This textbook is designed for undergraduate and graduate students who have some knowledge of environmental chemistry and fluid mechanics. Professionals in the wastewater industry will also find this a handy reference. To address the issue of discharge of untreated industrial effluent in the water body causing pollution, adoption of cleaner production technologies and waste minimization initiatives are being encouraged. The book explains each related technology elaborately and critically analyses the same from practical application point of view. In-depth characterization, environmental and health effects and treatment of various industrial effluents are discussed with case studies. Limitations, challenges and remedial actions to be taken are included at the end of each chapter. Chapters are arranged as per specific type of effluents from various industries like textile, tannery/leather plant, and oil refinery. The steady increase in industrialization, urbanization and enormous population growth are leading to production of huge quantities of wastewaters that may frequently cause environmental hazards. This makes waste water treatment and waste water reduction very important issues. The book offers a collection of studies and findings concerning waste water treatment, minimization and reuse.

Anaerobes in Biotechnology

The Microbiology of Anaerobic Digesters

Handbook of Industrial and Hazardous Wastes Treatment

Volume 11

Anaerobic Biotechnology for Industrial Wastewaters

Comprehensive Biotechnology, Third Edition unifies, in a single source, a huge amount of information in this growing field. The book covers scientific fundamentals, along with engineering considerations and applications in industry, agriculture, medicine, the environment and socio-economics, including the related government regulatory overviews. This new edition builds on the solid basis provided by previous editions, incorporating all recent advances in the field since the second edition was published in 2011. Offers researchers a one-stop shop for information on the subject of biotechnology Provides in-depth treatment of relevant topics from recognized authorities, including the contributions of a Nobel laureate Presents the perspective of researchers in different fields, such as biochemistry, agriculture, engineering, biomedicine and environmental science

Current Developments in Biotechnology and Bioengineering: Biological Treatment of Industrial Effluents provides extensive coverage of new developments, state-of-the-art technologies, and potential future trends in data-based scientific knowledge and advanced information on the role and application of environmental biotechnology and engineering in the treatment of industrial effluents. These treatment processes have been broadly classified under aerobic and anaerobic processes which determines the scope and level of pollutant removal. Chapters in this volume review the most recent developments and perspectives at different environmental cleanup operation scales. Outlines available biochemical processes for the treatment of solid industrial waste Covers aerobic and anaerobic treatments, their mechanisms, and selection criteria Highlights specific industrial applications, such as anammox processes

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.

The 52nd Purdue Industrial Waste Conference showcased 18 sessions on subjects such as biological aspects, physical-chemical aspects, oil and petroleum wastes, management and reuse strategies, international activities, and pollution prevention. This book compiles the work of nearly 200 international experts, covering the latest practical techniques, advanced research, new methods, actual operating data, and important case studies.

Anaerobic Waste-Wastewater Treatment and Biogas Plants

Anaerobic Pre-treatment of Agro-industrial Wastes in Kansas

Instrumentation, Control and Automation in Wastewater Systems

Advanced Processes and Technologies

Anaerobic Technology in Pulp and Paper Industry

Biotechnology in Industrial Waste Treatment and Bioremediation addresses the increasingly important topic of waste treatment. Focusing on microbiological degradation of contaminants, it offers a representative picture of the current status of environmental biotechnology and lays a solid foundation of the methods and applications of bioremediation. The expert presentations of case studies in this new book demonstrate successful treatment schemes and technologies meeting regulatory standards. These case studies represent an international cross-section of strategies for developing and implementing the evolving technologies of bioremediation. Biotechnology in Industrial Waste Treatment and Bioremediation examines the primary waste streams, including air, water, soils, and sediments, and explores specific treatment methodologies for industrial and environmental contaminants. This broad and unique coverage allows treatment firms and regulatory authorities to determine and develop appropriate treatment strategies for site-specific problems of waste remediation. The observations and successful field applications compiled in Biotechnology in Industrial Waste Treatment and Bioremediation make it an excellent reference for understanding, evaluating, developing, and operating efficient and cost-effective full-scale treatment systems.

This book presents a state-of-the-art report on the treatment of pulp and paper industry effluents using anaerobic technology. It covers a comprehensive range of topics, including the basic reasons for anaerobic treatment, comparison between anaerobic and aerobic treatment, effluent types suitable for anaerobic treatment, design considerations for anaerobic treatment, anaerobic reactor configurations applied for treatment of pulp and paper industry effluents, present status of anaerobic treatment in pulp and paper industry, economic aspects, examples of full scale installations and future trends.

Advanced Biological Treatment Processes for Industrial Wastewaters provides unique information relative to both the principles and applications of biological wastewater treatment systems for industrial effluents. Case studies document the application of biological wastewater treatment systems in different industrial sectors such as chemical, petrochemical, food-processing, mining, textile and fermentation. With more than 70 tables, 100 figures, 200 equations and several illustrations, the book provides a broad and deep understanding of the main aspects to consider during the design and operation of industrial wastewater treatment plants. Students, researchers and practitioners dealing with the design and application of biological systems for industrial wastewater treatment will find this book invaluable.

Presenting effective, practicable strategies modeled from ultramodern technologies and framed by the critical insights of 78 field experts, this vastly expanded Second Edition offers 32 chapters of industry- and waste-specific analyses and treatment methods for industrial and hazardous waste materials-from explosive wastes to landfill leachate to w

Comprehensive Biotechnology

Biogas, Economic and Environmental Potential

Anaerobic Digestion in Built Environments

Anaerobic Biotechnology for Bioenergy Production

Environmental Biotechnology

Environmental protection and resource recovery are two crucial issues facing our society in the 21st century. Anaerobic biotechnology has become widely accepted by the wastewater industry as the better alternative to the more conventional but costly aerobic process and tens of thousands of full-scale facilities using this technology have been installed worldwide in the past two decades. Anaerobic Biotechnology is the sequel to the well-received Environmental Anaerobic Technology: Applications and New Developments (2010) and compiles developments over the past five years. This volume contains contributions from 48 renowned experts from across the world, including Gatze Lettinga, laureate of the 2007 Tyler Prize and the 2009 Lee Kuan Yew Water Prize, and Perry McCarty, whose pioneering work laid the foundations for today's anaerobic biotechnology. This book is ideal for engineers and scientists working in the field, as well as decision-makers on energy and environmental policies.

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Energy;Digestion;Sustainability;Biogas;Hydrogen;Methane;Production;Metagenome;Metagenomics;Modeling;Anammox;UASB;EGSB;Microbial Fuel Cell;MFC;Membrane Bioreactor;MBR;Syntroph;Stoichiometry;Equilibrium;Buffer;Ammonia;Sulfide;Fluidized Bed;Application;Development;Fundamental;Analysis;Development;Technology;Holistic;China;Brazil;Japan;Latin America;Asia;Taiwan;Distillery;Farm;Sugar Cane

The main subject of the Workshop was the new developments about the cost effective treatment techniques for better removal efficiencies and dis cussion of policies for pollution control. Although effluent water quality requirements differ from one country to another, their application will be an efficient mean for water pollution control. Specific promotion should be provided for polluters to meet the effluent water quality requirements. Results of pilot scale studies demonstrate the applicability of and ad vantages of sequenching batch reactor technology for pretreatment of in dustrial wastewaters Fixed film biological reactors offer the possibility to enrich slow growing specialized microorganisms by developing biofilms on support materials. Physical chemical processes are used for the treatment of unusual and difficult industrial wastewaters and membrane technologies for the con centration and recovery of raw materials and by-products, in industries where the conventional treatment technologies are inappropriate or uneco nomic-Physical chemical processes give higher efficiencies when polymers are applied but the composition of these long chain chemicals is an im portant consideration; Most developing countries suffer from severe environmental problems and shortage of energy and resources. These countries urgently need simple, inexpensive and integrated environmental protection system, which combine wastewater treatment with recovery and reuse. Anaerobic treatment offer many advantages in this respect. Because recovery of substances from wastes serves twofold purpose of recyle and pollution control, it must be applied where possible.

Due to the heterogeneous nature of water streams from diverse domestic and industrial sources, and the equally diverse nature of pollutants that can be physical, chemical, and biological in nature, their treatment methods also must be varied in nature.

Responding to this complex situation, Wastewater Treatment: Advanced Processes and Technologies p

The book guides specialists and non-specialists from around the world on how or whether anaerobic processes can be part of solutions for the management of municipal and industrial solid, semi-solid, and liquid residues. The simple self-learning presentation style is designed to encourage deep understanding of the process principles, plant types and system configurations, performance capabilities, operational and maintenance requirements, post-treatment needs, and management options for coproducts without complex biochemical terminologies and equations. It describes key aerobic biological treatment processes used in conjunction with anaerobic biological treatment in feedstock pre-treatment and in post-treatment of by-products. Practical pre-treatment processes, techniques and operations are described alongside additional treatment techniques of biogas, digestates and treated effluents for various end use options. Effective applications in developing countries are also considered, enabling practitioners and plant operators to effectively apply technology in temperate and warm climatic conditions.

Environmental Bioengineering

Proceedings of the 45th Industrial Waste Conference May 1990, Purdue University

Sustainable Water and Wastewater Processing

Energy Research Abstracts

Focus on Biotechnology Research