



# MICROBIAL GRANULATION TECHNOLOGY FOR NUTRIENT REMOVAL FROM WASTEWATER

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NOVA

# Microbial Granulation Technology For Nutrient Removal From Wastewater

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## **Microbial Granulation Technology For Nutrient Removal From Wastewater:**

Microbial Granulation Technology for Nutrient Removal from Wastewater Yu Liu, Lei Qin, Shu-Fang Yang, 2007 Aerobic granulation technology for wastewater treatment has been widely exploited in recent years. Currently, research on aerobic granulation is being intensively conducted in universities, institutes, private or public interest research organisations worldwide. This book provides the latest research outcomes on the fundamentals and applications of this technology for biological nutrient removal from wastewater. The book offers researchers and practitioners in wastewater treatment engineering up to date knowledge and understanding of this novel nutrient removal biotechnology. **Technologies for the Treatment and Recovery of Nutrients from Industrial Wastewater** Val del Río, Ángeles, Campos Gómez, José Luis, Mosquera Corral, Anuska, 2016-10-21 The production of wastewater from various human and industrial activities has a harsh impact on the environment. Without adequate treatment, the disposal of this wastewater poses a threat to the quality of water globally. *Technologies for the Treatment and Recovery of Nutrients from Industrial Wastewater* investigates emergent research and best practices within the field of wastewater management. Highlighting novel technological tools in wastewater treatment, effective nutrient removal technologies and innovative solutions to quality water preservation practices, this book is a critical reference source for professionals, scientists, academics and students. Microbial Biofilms in Bioremediation and Wastewater Treatment Y.V. Nancharaiyah, Vayalam P. Venugopalan, 2019-10-18 Biofilms represent the natural living style of microbial communities and play a pivotal role in biogeochemical cycles and natural attenuation. Biofilms can be engineered for biodegradation and biotransformation of organic and inorganic contaminants for both in situ bioremediation and ex situ treatment in bioreactors. This book focuses on microbial biofilms and their potential technological applications for sustainable development. It covers recent advances in biofilm technologies for contaminant remediation coupled to recovery of resources and serves as a complete reference on the science and technology behind biofilm mediated bioremediation and wastewater treatment. *Water Infrastructure for Sustainable Communities* Xiaodi Hao, Vladimir Novotny, Valerie Nelson, 2010-07-31 A new model for water management is emerging worldwide in response to water shortages, polluted waterways, climate change and loss of biodiversity. Cities and towns are questioning the ecological and financial sustainability of big pipe water, stormwater and sewer systems and are searching for lighter footprint, more sustainable solutions. Pilot projects are being built that use treat, store and reuse water locally and that build distributed designs into restorative hydrology. This book has been developed from the conference on Sustainable Water Infrastructure for Villages and Cities of the Future SWIF2009 held in November 2009 in Beijing, China, that brought together an international gathering of experts in urban water and drainage infrastructure, landscape architecture, economics, environmental law, citizen participation, utility management, green building and science and technology development. *Water Infrastructure for Sustainable Communities: China and the World* reveals how imaginative concepts are being developed and implemented to ensure that cities, towns and villages and their water

resources can become ecologically sustainable and provide clean water With both urban and rural waters as a focal point the links between water quality and hydrology landscape and the broader concepts of green cities villages and smart development are explored The book focuses on decentralized concepts of potable water stormwater and wastewater management that would provide clean water It results in water management systems that would be resilient to extreme events such as excessive flows due to extreme meteorological events severe droughts and deteriorated water and urban ecosystem quality A particular emphasis is placed on learning lessons from the many innovative projects being designed in China and other initiatives around the world The principal audience for the book is university faculty and students scientists in research institutes water professionals governmental organizations NGOs urban landscape architects and planners Visit the IWA WaterWiki to read and share material related to this title <http://www.iwawaterwiki.org/xwiki/bin/view/Articles/WaterInfrastructureforSustainableCommunities> Edited by Professor Xiaodi Hao Beijing University of Civil Engineering and Architecture P R of China Professor Vladimir Novotny Northeastern University Boston USA and Dr Valerie Nelson Coalition for Alternative Wastewater Treatment MA USA

*Management of Wastewater and Sludge* Izharul Haq Farooqi, Saif Ullah Khan, 2023-05-12 Management of micropollutants and disinfection of byproducts in municipal wastewater and extraction of energy from the sludge produced in wastewater treatment plants is under constant focus This book presents a detailed know how regarding sustainable management of waste produced in municipal and industrial activities through novel state of the art techniques used for the treatment of toxic industrial wastes and municipal wastewater It deals with the management of municipal sludge and solid waste including leachates produced from landfill sites It also provides detailed information for achieving the stringent standards set by regulatory bodies for municipal and industrial effluents Features Covers development of new novel reactor configurations for wastewater treatment Describes handling and removal of emerging contaminants like pharmaceutical compounds endocrine disruptors and disinfection byproducts Deliberates combination of wastewater and micropollution Contains an in depth discussion on treatment and disposal of fecal sludge Highlights new economically feasible techniques to enhance biogas recovery from treatment plant sludges This book is aimed at researchers and graduate students in environmental engineering wastewater treatment mechanical engineering chemical engineering and energy engineering

**Waste Management: Concepts, Methodologies, Tools, and Applications** Management Association, Information Resources, 2019-12-06 As the world s population continues to grow and economic conditions continue to improve more solid and liquid waste is being generated by society Improper disposal methods can not only lead to harmful environmental impacts but can also negatively affect human health To prevent further harm to the world s ecosystems there is a dire need for sustainable waste management practices that will safeguard the environment for future generations Waste Management Concepts Methodologies Tools and Applications is a vital reference source that examines the management of different types of wastes and provides relevant theoretical frameworks about new waste management

technologies for the control of air water and soil pollution Highlighting a range of topics such as contaminant removal landfill treatment and recycling this multi volume book is ideally designed for environmental engineers waste authorities solid waste management companies landfill operators legislators environmentalists policymakers government officials academicians researchers and students Microbial Wastewater Treatment Maulin P. Shah,Susana Rodriguez-Couto,2019-06-12

Microbial Wastewater Treatment focuses on the exploitation of microorganisms as decontaminating tools to treat polluted wastewater a worldwide concern Microorganism based processes are seen as promising technologies to treat the ever increasing problem of polluted wastewater The book covers recently developed process technologies to solve five major trends in the field of wastewater treatment including nutrient removal and recovery trace organic compounds energy saving and production sustainability and community involvement Illustrates the importance of microorganisms in wastewater treatment Points out the reuse of the treated wastewater Highlights the recovery of resources from wastewater Pays attention to the occurrence of novel micro pollutants Introduces new trends in wastewater technology **Biological and**

**Hybrid Wastewater Treatment Technology** Makarand M. Ghangrekar,Shalini Yadav,Ram Narayan Yadava,2024-08-02 This book provides technical information on different biological and hybrid wastewater treatment systems for the treatment of wastewater and reuse and tracks their progress towards practical and field scale applications including strategies to be adopted for minimizing the losses and maximizing the benefits as well as protecting the environment through the application of advanced biological and hybrid wastewater treatment Technology In addition it discusses the crucial parts that science technology and innovation play in the formulation implementation and administration of wastewater treatment policy It highlights the challenges that must be overcome to adopt biological and hybrid wastewater treatment infrastructure regulations successfully and provides some answers Also it investigates how the biological and hybrid wastewater treatment technology may be used in a wide variety of field s sets apart from other on the shelf publications on the market Also it delves into the core concepts of Biological and Hybrid Wastewater Treatment Systems It explores how these concepts can be modified to fit a variety of contexts and uses Applications such as managing facilities dealing with pandemics urban wastewater treatment and reuse farming and other applications are included in this book As a consequence this book s content is engaging and it will pique the interest of a diverse audience of readers who come from a wide variety of different professional backgrounds Therefore the book is written by local experts in the topic who dealing with the treatment of wastewater treatment technologies for a long time in India This book will be helpful to researchers entrepreneurs professionals planners policymakers environmental engineers and others interested in biological and hybrid wastewater treatment system management strategies through the application of breakthroughs in biological and hybrid wastewater treatment technologies *Library of Congress Subject Headings* Library of Congress,2007 *The 6th International Symposium on Water Resource and Environmental Management* Haoqing Xu,2024-04-29 This book is designed to be the

introductory work in the Water Energy Environment Governance from Interdisciplinary Perspectives Series and provides an in depth look at sustainable development and management in the water sector across The water energy environment nexus WEEN represents important interstate connections of water energy and the environment Present day water and energy systems are interdependent Water is used in all phases of energy production and electricity generation Energy is required to extract convey and deliver water of appropriate quality for diverse human uses and then again to treat waste waters prior to their return to the environment Security in water energy and the environment is associated with human economic and environmental sustainability This interweaving is strengthening under aggregating natural resource scarcity and climate change This book includes selected papers from the 6th International Symposium on Water Resource and Environmental Management WREM 2023 and consists of themes pertaining to water resource and environmental management It provides readers with comprehensive information and formulation of solutions leading to a set of Water Energy Environment Governance from Interdisciplinary Perspectives through our forum and the publication of your research As a reference it is of interest to students scientists engineers government officials and water resource managers

**Removal of Emerging Contaminants Through Microbial Processes** Maulin P Shah, 2020-10-14 The abundance of organic pollutants found in wastewater affect urban surface waters Traditional wastewater management technologies focus on the removal of suspended solids nutrients and bacteria however new pollutants such as synthetic or naturally occurring chemicals are often not monitored in the environment despite having the potential to enter the environment and cause adverse ecological and human health effects Collectively referred to as emerging contaminants they are mostly derived from domestic activities and occur in trace concentrations ranging from pico to micrograms per liter Environmental contaminants are resistant to conventional wastewater treatment processes and most of them remain unaffected causing contamination of receiving water This in turn leads to the need for advanced wastewater treatment processes capable of removing environmental contaminants to ensure safe fresh water sources This book provides an up to date overview of the current bioremediation strategies including their limitations challenges and their potential application to remove environmental pollutants It also introduces the latest trends and advances in environmental bioremediation and presents the state of the art in biological and chemical wastewater treatment processes As such it will appeal to researchers and policy makers as well as undergraduate and graduate environmental sciences students

**Innovative Wastewater Treatment & Resource Recovery Technologies: Impacts on Energy, Economy and Environment** Juan M. Lema, Sonia Suarez Martinez, 2017-06-15 This book introduces the 3R concept applied to wastewater treatment and resource recovery under a double perspective Firstly it deals with innovative technologies leading to Reducing energy requirements space and impacts Reusing water and sludge of sufficient quality and Recovering resources such as energy nutrients metals and chemicals including biopolymers Besides targeting effective C N Re Thinking which implies a substantial flowsheet modification and Re

Imagining with completely new conceptions Tools are presented for Modelling Optimising and Selecting the most suitable plant layout for each particular scenario from a holistic technical economic and environmental point of view Handbook of Metal-Microbe Interactions and Bioremediation Surajit Das,Hirak Ranjan Dash,2017-04-07 Around the World metal pollution is a major problem Conventional practices of toxic metal removal can be ineffective and or expensive delaying and exacerbating the crisis Those communities dealing with contamination must be aware of the fundamentals advances of microbe mediated metal removal practices because these methods can be easily used and require less remedial intervention This book describes innovations and efficient applications for metal bioremediation for environments polluted by metal contaminates Removal of Toxic Pollutants through Microbiological and Tertiary Treatment Maulin P. Shah,2020-08-20 Removal of Toxic Pollutants through Microbiological and Tertiary Treatment New Perspectives offers a current account of existing advanced oxidation strategies including their limitations challenges and potential applications in removing environmental pollutants through microbiological and tertiary treatment methods The book introduces new trends and advances in environmental bioremediation technology with thorough discussion of recent developments in the field Updated information as well as future research directions in the field of bioremediation of industrial wastes is included This book is an indispensable guide to students researchers scientists and professionals working in fields such as microbiology biotechnology environmental sciences eco toxicology and environmental remediation The book also serves as a helpful guide for waste management professionals and those working on the biodegradation and bioremediation of industrial wastes and environmental pollutants for environmental sustainability Introduces various treatment schemes including microbiological and tertiary technologies for bioremediation of environmental pollutants and industrial wastes Includes pharmaceutical wastewater oil refinery wastewater distillery wastewater tannery wastewater textile wastewater mine tailing wastes plastic wastes and more Describes the role of relatively new treatment technologies and their approaches in bioremediation including molecular and protein engineering technologies microbial enzymes bio surfactants plant microbe interactions and genetically engineered organisms Provides many advanced technologies in the field of bioremediation and phytoremediation including electro bioremediation technology microbial fuel cell technology nano bioremediation technology and phytotechnologies **Nitrogen Cycle** Jesus Gonzalez-Lopez,Alejandro Gonzalez-Martinez,2021-07-22 Anthropogenic activity has clearly altered the N cycle contributing among other factors to climate change This book aims to provide new biotechnological approach representing innovative strategies to solve specific problems related to the imbalance originating in the N cycle Aspects such as new conceptions in agriculture wastewater treatment and greenhouse gas emissions are discussed in this book with a multidisciplinary vision A team of international authors with wide experience have contributed up to date reviews highlighting scientific principles and their environmental importance and integrating different biotechnological processes in environmental technology **Advances systems for biological treatment of high**

**nitrogen-loaded wastewater.** , *Valorisation of Agro-industrial Residues - Volume I: Biological Approaches* Zainul Akmar Zakaria, Ramaraj Boopathy, Julian Rafael Dib, 2020-03-04 Agriculture and industry are the two most important economic sectors for various countries around the globe providing millions of jobs as well as being the main source of income for these countries. Nevertheless, with the increasing demand for agricultural and industrial produce, huge amounts of waste are also being produced. Without proper management, this waste, both liquid and solid, poses a serious threat to overall environmental quality, mainly due to its toxicity and slow degradation processes. Current approaches are effective but would normally require huge capital investments, are labour intensive, and generate potential hazardous by-products. As such, there is a need for alternative approaches that are cheaper, easier to handle, and have a minimum potential impact on environmental quality. This book presents up-to-date approaches using biological techniques to manage the abundance of waste generated from agricultural and industrial activities. It discusses techniques such as bioconversion, biodegradation, biotransformation, and biomonitoring, as well as the utilization of these wastes. A number of chapters also include individual case studies to enhance readers' understanding of the topics. This comprehensive book is a useful resource for anyone involved in agricultural and industrial waste management, green chemistry, or biotechnology. It is also recommended as a reference work for graduate students and all agriculture and biotechnology libraries.

**Optimization and Applicability of Bioprocesses** Hemant J. Purohit, Vipin Chandra Kalia, Atul N. Vaidya, Anshuman A. Khardenavis, 2018-01-02 This book argues that the sustainable management of resources requires a systematic approach that primarily involves the integration of green, innovative biotechnological strategies and eco-engineering. It discusses how microbial community intelligence can be used for waste management and bio-remediation and explains how biological processes can be optimized by integrating genomics tools to provide perspectives on sustainable development. The book describes the application of modern molecular techniques such as fluorescence in situ hybridization (FISH), highly sensitive catalyzed reporter deposition (CARD-FISH), in situ DNA hybridization, chain reaction (HCR), and methods for detecting mRNA and/or functional genes to optimize bioprocesses. These techniques, supplemented with metagenomic analysis, reveal that a large proportion of microorganisms still remain to be identified and also that they play a vital role in establishing bioprocesses.

**Current Developments in Biotechnology and Bioengineering** Xuan-Thanh Bui, Dinh Duc Nguyen, Phuoc-Dan Nguyen, Huu Hao Ngo, Ashok Pandey, 2022-08-19 *Advances in Biological Wastewater Treatment Systems* covers different recent advanced technologies, including green technologies for biological wastewater treatment and wastewater reuse. The technologies involve novel biological processes and/or modified processes coupled with nano materials for improving the performance of the existing treatment processes. The book also describes treatment strategies for the current pollution from complex organic matter, nutrients, toxic substances, microplastics, and emerging micro-pollutants in different water resources. The treatment processes describe the recent developed technologies for wastewater treatment and reuse, such as biological nutrient removal, bioreactors, photobioreactors, membrane



bioreactors wetlands algae bacteria process natural treatments integrated hybrid bio systems etc The novel bio systems include aerobic anaerobic facultative operation modes with various of types of microorganisms Provides updated information on biological nutrient removal from wastewater Includes anaerobic and aerobic wastewater treatment processes Provides state of art information on design and operation of novel systems including membrane bioreactors Describes hybrid treatment processes

**Handbook of Environment and Waste Management** Yung-Tse Hung, Lawrence K. Wang, Nazih K. Shammash, 2012 This is a compilation of topics that are at the forefront of many technical advances and practices in air and water control These include air pollution control water pollution control water treatment wastewater treatment industrial waste treatment and small scale wastewater treatment

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