

Biological Treatment Of Landfill Leachate

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<i>Biological Treatment Of Landfill Leachate</i>	2022-12-14
AINSLEY STARK	

Treatment of Landfill Leachate Using Biological Aerated Filtration Springer

FROM THE PREFACE Sanitary landfills are the most widely utilized method of solid waste disposal around the world. With increased use and public awareness of this method of disposal, there is much concern with respect to the pollution potential of the landfill leachate. Depending on the composition and extent of decomposition of the refuse and hydrological factors, the leachate may become highly contaminated. As leachate migrates away from a landfill, it may cause serious pollution to the groundwater aquifer as well as adjacent surface waters. There is growing concern about surface and groundwater pollution from leachate. Better understanding and prediction of leachate generation, containment, and treatment are needed. This book contains a literature review of various methodologies that have been developed for prediction, generation, characterization, containment, control, and treatment of leachate from sanitary landfills. The contents of this book are divided into nine chapters. Each chapter contains theory and definition of the important design parameters, literature review, example calculations, and references. Chapter 1 is devoted to basic facts of solid waste problems current status and future trends towards waste reduction and recycling. Chapter 2 provides a general overview of municipal solid waste generation, collection, transport, resource recovery and reuse, and disposal options. The current status of sanitary landfill design and operation, problems associated with the landfilling, and future trends are presented in Chapter 3. Methods of enhanced stabilization, recycling landfill space, methane recovery, and above grade landfilling, and closure and post closure care of completed landfills are also discussed in detail. Chapter 4 provides a general overview of Subtitle D regulations and its impact upon sanitary landfilling practices. Chapter 5 is devoted entirely to moisture routing and leachate generation mechanisms. Examples of calculation pr

The Role of Algae in the Biological Treatment of Sanitary Landfill Leachate IGI Global

Concern for environmental protection has increased from a global viewpoint due to the exponential population and civilization growth; accompanied by the rapid generation of municipal and industrial solid waste which creates the most instringent paradox around the world. Sanitary landfills are considered as most indispensable solid waste management strategy for sustainable disposal but such implementation is handicapped by the inherent drawback of landfill leachates. The leachate being extremely toxic in nature are threat for the surrounding soil, groundwater and surface water. Aerobic treatment in the form of attached growth biomass systems is considered effective in removal of organic matter from the leachate. The biological oxidation and biosynthesis of organic matter present in leachate is done by the microorganisms used in the treatment process. The process is effective as compared to the other conventional anaerobic treatment of leachate as along with the organic matter harmful ammonical nitrogen can also be conventionally removed. Among all the technologies available for leachate treatment RBC(Rotatory Biological Contractor) is the most cost effective and efficient.

Landfill leachate treatment - with particular reference to an aerobic biological treatment system LAP Lambert Academic Publishing

Municipal solid waste (MSW) disposal is an ever-increasing problem in many parts of the world, especially in developing countries. To date, landfilling is still the preferred option for the disposal and management of MSW due to its low-cost operation. While this solution is advantageous from a cost perspective, it introduces a high level of potential pollutants which can be detrimental to the local environment. Control and Treatment of Landfill Leachate for Sanitary Waste Disposal presents research-based insights and solutions for the proper management and treatment of landfill leachate. Highlighting relevant topics on emerging technologies and treatment innovations for minimizing the environmental hazards of waste disposal, this innovative publication contributes to filling in many of the gaps that exist in the current literature available on leachate treatment. Waste authorities, solid waste management companies, landfill operators, legislators, environmentalists, graduate students, and researchers will find this publication beneficial to their professional and academic interests in the area of waste treatment and management.

Pollution Control Technology for Leachate from Municipal Solid Waste Routledge

Aerobic Granular Sludge has recently received growing attention by researchers and technology developers, worldwide. Laboratory studies and preliminary field tests led to the conclusion that granular activated sludge can be readily established and profitably used in activated sludge plants, provided 'correct' process conditions are chosen. But what makes process conditions 'correct'? And what makes granules different from activated sludge flocs? Answers to these question are offered in Aerobic Granular Sludge. Major topics covered in this book include: Reasons and mechanism of aerobic granule formation Structure of the microbial population of aerobic granules Role, composition and physical properties of EPS Diffuse limitation and microbial activity within granules Physio-chemical characteristics Operation and application of granule reactors Scale-up aspects of granular sludge reactors, and case studies Aerobic Granular Sludge provides up-to-date information about a rapidly emerging new technology of biological treatment.

Technical Guidance for NPDES Permitting of Landfill Leachate Discharges IWA Publishing

The advantages inherent in anaerobic submerged filter system coupled with the amenability of this process in its application to leachate stabilization suggests that it is worthy of consideration as a basis for full scale leachate treatment facilities. The AnSBF is well suited to handling the large organic loads that often characterize leachates, particularly leachates that are discharged from young landfills. More than 96% COD and BOD can be removed

from a high-strength acidic leachate waste-water, according to the present study, if the organic loading is controlled not in excess of 75.2 lb COD/1000 cu ft -day or 56.4. Metal removal efficiency is high when the influent concentrations of Fe(III) and Zn(II) are less than 115.3 mg/l and 10.4 mg/l, respectively. In addition to the efficient treatment of soluble COD, BOD, and heavy metals, the anaerobic filter requires no effluent recycle or sludge return.

The Chemical and Biological Treatment of Sanitary Landfill Leachate LAP Lambert Academic Publishing

The Handbook of Environment and Waste Management, Volume 1, Air and Water Pollution Control, is a comprehensive compilation of topics that are at the forefront of many technical advances and practices in air and water pollution control. These include air pollution control, water pollution control, water treatment, wastewater treatment, industrial waste treatment and small scale wastewater treatment. Internationally recognized authorities in the field of environment and waste management contribute chapters in their areas of expertise. This handbook is an essential source of reference for professionals and researchers in the areas of air, water, and waste management, and as a text for advanced undergraduate and graduate courses in these fields.

Generation, Control and Treatment IGI Global

The overall objectives of this research are (1) to supply information allowing Facility Engineers (FEs) at Army installations both to recognize potential or actual leachate problems and to gauge the magnitude of the problems, (2) to provide guidance on short- and long-term remedial actions which might control leachate formation and migration, and (3) to provide information to installation, FE, major command, and district personnel regarding legal ramifications of and responsibilities concerning leachate gas/problems. The objective of the phase of the study reported here is to provide FEs (1) an overview of the technologies that can be used to treat leachate, and (2) guidance on choosing and designing leachate treatment systems that will meet the Army's needs. An extensive literature survey identified technologies which have been used to treat leachate, or have shown potential for treating waste with characteristics similar to leachate. Technologies were examined in terms of their operational principles, waste treatment capability, major design and construction parameters, advantages and disadvantages, and estimated costs. Particular emphasis was given to lagoon technology because it has low capital, operation, and maintenance costs, and it is a form of biological treatment which has shown the most potential for treating typical Army leachates.

Aerobic Biotreatability Studies on Sanitary Landfill Leachate CRC Press

Landfill Leachates will provide an invaluable source of information on the subject for scientists, engineers, practitioners, policy makers, and regulatory officials. Constructed wetlands are proving to be the best natural treatment system for landfill leachates. Most of the contaminants in landfill leachates are degraded in treatment wetlands. Potential for long-term sustainability and significant cost savings are attractive features of this eco-technology. Documentation of the experience in this use of constructed wetlands has been limited. Constructed Wetlands for the Treatment of Landfill Leachates is the first compilation of the results of research from North America and Europe. Originally presented at an international symposium, this collection of papers offers the most recent research findings from the leading researchers in this new and innovative natural treatment system. Specific issues addressed in the text include: leachate characteristics, and the potential for treatability by constructed wetlands wetland treatment, processes and transformation use of constructed wetlands in cold climatic conditions assessment of the tolerance of wetland plants to the toxicity of leachates role of plants in the treatments of leachates integrated wetland systems performance of different wetland treatment systems cost comparisons of wetland technology vs. traditional treatment technologies The potential for environmental contamination due to leachates from landfills is increasing, and there is an urgent need to find ways and means to treat leachates in a sustainable way Constructed Wetlands for the Treatment of

New Advances and Technologies Routledge

Pollution Control Technology for Leachate from Municipal Solid Waste explores the physical, chemical and biological factors that produce leachate and technological solutions for its control. The book introduces the integrated and pre-treatment leachate treatment processes that are necessary to deal with the variations of pollutants in leachate. Real world case-studies are provided to illustrate these treatment processes, along with leachate treatment engineering process design and the construction of municipal solid waste incinerator power plants. This book will be of particular interest to Civil, Chemical and Environmental Engineers, but will also be ideal for Environmental Scientists. Provides quantity and quality prediction models, along with properties of effluent concentrated leachate liquid Includes physical and chemical treatment processes for leachate, including ammonia nitrogen removal using struvite precipitation, crystal variation and microstructure of the struvite, etc. Covers leachate treatment engineering processes for design and construction of treatment plants

Assessment and Remediation of Environmental Hazards Butterworth-Heinemann

Population growth and industrial development have increased the amount of wastewater generated by urban areas, and one of the major problems facing industrialized nations is the contamination of the environment by hazardous chemicals. Therefore, to meet the standards, suitable treatment alternatives should be established. Advanced Oxidation Processes (AOPs) in Water and Wastewater Treatment is a pivotal reference source that provides vital research on the current, green, and advanced technologies for wastewater treatment. While highlighting topics such as groundwater treatment, environmental legislation, and oxidation processes, this publication explores the contamination of environments by hazardous chemicals

as well as the methods of decontamination and the reduction of negative effects on the environment. This book is a vital reference source for environmental engineers, waste authorities, solid waste management companies, landfill operators, legislators, environmentalists, and academicians seeking current research on achieving sustainable management for wastewater treatment.

[Proceedings of the 44th Industrial Waste Conference May 1989, Purdue University](#) Routledge

The integrity of groundwater sources is constantly threatened by contaminant plumes generated by accidental gasoline leakages and leachates escaping landfills. These plumes are of concern due to their proven toxicity to living organisms. Aromatic and chlorinated hydrocarbons, volatile fatty acids, phenols, and ammonia have been found in these leachates. In addition, benzene, toluene, and xylenes (BTX) are major components of gasoline. The lack of oxygen in groundwater makes anaerobic bioremediation desired for the treatment of groundwater contaminated with BTX and chlorinated solvents. With the objective of finding microorganisms capable of BTX and cis-dichloroethylene (cis-DCE) degradation under anaerobic conditions for their use in permeable reactive barriers, different inocula were tested in batch experiments. Toluene was rapidly degraded by several inocula in the presence of alternative electron acceptors. Benzene and m-xylene were eliminated by few of the inocula tested after incubation periods ranging from 244 to 716 days. cis-DCE was highly recalcitrant as no degradation was observed over 440 days. Biological processes have been successfully applied for the treatment of landfill leachates as well. In an effort to provide an effective and economical alternative, an anaerobic-aerobic system was evaluated using a synthetic media simulating the organic and ammonia content of real leachates. The removal of the organic content reached 98% in an upflow anaerobic sludge blanket reactor, and resulted in the formation of methane. During the aerobic process, in an innovative down-flow sponge reactor, ammonia was highly transformed to nitrite and nitrate. Complete nitrification was eventually achieved. The capacity of current wastewater treatment plants for removing nanoparticles has been questioned during the last years. Nanoparticles have been incorporated into numerous applications and their presence in wastewater seems to be inevitable. A laboratory-scale secondary treatment system was set-in to study the behavior of cerium and aluminum oxide nanoparticles during wastewater treatment. The nanoparticles were highly removed, suggesting that secondary treatment is suitable for their elimination. The removal of these nanoparticles was influenced by the pH and organic content of the wastewater. Aluminum nanoparticles proved to be toxic; however the performance of the system for eliminating the organic content was recovered over time.

Landfilling of Waste IGI Global

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.

Leachate World Scientific

In the third part of this dissertation the application of flushing/Fenton's reagent oxidation to produce sustainable solid waste cells was evaluated. A treatment similar to pump and treat process utilizing Fenton's reagent on-site treated leachate combined with in-situ aeration was proposed. Treated leachate would be recycled to the landfill cell flushes releasable nonbiodegradable carbon from the cell and oxidizes it externally. This technique was demonstrated to have treatment cost and time benefits over other alternatives for producing completely stable solid waste cells such as anaerobic flushing and biological and/or mechanical pretreatment of solid waste (used in the EU).

[Chemical and Biological Treatment of Mature Landfill Leachate](#) CRC Press

This book contains a collection of research works focused on the biodegradation of different types of pollutants, both in water and solids. The book is divided in three major sections: A) Biodegradation of organic pollutants in solids and wastewater, B) Biodegradation of complex pollutants, and C) Novel technologies in biodegradation and bioremediation.

[Biodegradation and Bioremediation of Polluted Systems](#) BoD – Books on Demand

Practical Techniques for Groundwater and Soil Remediation is a compilation of articles by the author that were printed in the National Ground Water Association (NGWA) magazine Groundwater Monitoring Review. The book provides valuable data, emphasizes the practical aspects of remediation, presents results from actual remediation programs, and helps readers prepare remediation strategies. The book also includes detailed technical data on treatment equipment performance and the costs associated with their design and operation. A unique feature of the book is that it also contains

data from treatment systems that did not work. Practical Techniques for Groundwater and Soil Remediation is a "must have" source of invaluable data and tips that will be useful for all groundwater and soil remediation professionals.

Treatment of Landfill Leachate Using Rotatory Biological Contractor Biological Treatment of Landfill LeachateExploration of Biological Treatment Systems for the Removal of Persistent Landfill Leachate Contaminants and NanoparticlesThe integrity of groundwater sources is constantly threatened by contaminant plumes generated by accidental gasoline leakages and leachates escaping landfills. These plumes are of concern due to their proven toxicity to living organisms. Aromatic and chlorinated hydrocarbons, volatile fatty acids, phenols, and ammonia have been found in these leachates. In addition, benzene, toluene, and xylenes (BTX) are major components of gasoline. The lack of oxygen in groundwater makes anaerobic bioremediation desired for the treatment of groundwater contaminated with BTX and chlorinated solvents. With the objective of finding microorganisms capable of BTX and cis-dichloroethylene (cis-DCE) degradation under anaerobic conditions for their use in permeable reactive barriers, different inocula were tested in batch experiments. Toluene was rapidly degraded by several inocula in the presence of alternative electron acceptors. Benzene and m-xylene were eliminated by few of the inocula tested after incubation periods ranging from 244 to 716 days. cis-DCE was highly recalcitrant as no degradation was observed over 440 days. Biological processes have been successfully applied for the treatment of landfill leachates as well. In an effort to provide an effective and economical alternative, an anaerobic-aerobic system was evaluated using a synthetic media simulating the organic and ammonia content of real leachates. The removal of the organic content reached 98% in an upflow anaerobic sludge blanket reactor, and resulted in the formation of methane. During the aerobic process, in an innovative down-flow sponge reactor, ammonia was highly transformed to nitrite and nitrate. Complete nitrification was eventually achieved. The capacity of current wastewater treatment plants for removing nanoparticles has been questioned during the last years. Nanoparticles have been incorporated into numerous applications and their presence in wastewater seems to be inevitable. A laboratory-scale secondary treatment system was set-in to study the behavior of cerium and aluminum oxide nanoparticles during wastewater treatment. The nanoparticles were highly removed, suggesting that secondary treatment is suitable for their elimination. The removal of these nanoparticles was influenced by the pH and organic content of the wastewater. Aluminum nanoparticles proved to be toxic; however the performance of the system for eliminating the organic content was recovered over time.Adsorptive Biological Treatment Of Landfill Leachate

New research-case histories and operating data-on every conceivable facet of today's big problem are detailed in the latest Purdue Book-with unparalleled appropriate, usable information and data for your current industrial waste problems from the May 1989 Conference.

[Biological Treatment of Landfill Leachate Using Sequencing Batch Reactor](#) John Wiley & Sons

This book presents new application processes in the context of anaerobic digestion (AD), such as phosphorus recovery, microbial fuel cells (MFCs), and seaweed digestion. In addition, it introduces a new technique for the modeling and optimization of AD processes. Chapters 1 and 2 review AD as a technique for converting a range of organic wastes into biogas, while Chapter 3 discusses the recovery of phosphorus from anaerobically digested liquor. Chapters 4 and 5 focus on new techniques for modeling and optimizing AD. Chapters 6 and 7 then describe the state of the art in AD effluent treatment. The book's final three chapters focus on more recent developments, including microbial fuel cells (MFCs) (Chapter 8), seaweed production (Chapter 9), and enzyme technologies (Chapter 10).

Concepts, Methodologies, Tools, and Applications IGI Global

Early biological treatment studies with the raw leachate did not yield high COD and nitrogen removals. In order to improve biological treatability, the landfill leachate was subjected to pretreatment by chemical coagulation-flocculation followed by air stripping of ammonia. The pretreated leachate was subjected to aerobic biological treatment in an aeration tank by fed-batch operation. In order to improve the extent of COD and ammonium nitrogen removals, pretreated leachate was subjected to adsorbent supplemented biological treatment in an aeration tank operated in fed-batch mode by using powdered zeolite (PZ) and powdered activated carbon (PAC) as adsorbents. Chemical oxidation was used to further reduce COD content of landfill leachate after PAC added biological treatment. Three oxidizing agents (H₂O₂, Fenton's reagent, NaOCl) were used in different concentrations for chemical oxidation.

[Advanced Oxidation Processes \(AOPs\) in Water and Wastewater Treatment](#) CRC Press

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.

[Perspectives on Biological Treatment of Sanitary Landfill Leachate](#)

Biological Treatment of Landfill LeachateExploration of Biological Treatment Systems for the Removal of Persistent Landfill Leachate Contaminants and Nanoparticles