LEMBAR HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH: JURNAL ILMIAH

Judul Karya Ilmiah (Artikel)	:	Waste valorization using solid-phase microbial fuel cells (SMFCs): Recent trends and status
Jumlah Penulis	:	8 orang
Status Pengusul	:	Penulis Utama
Penulis Jurnal Ilmiah	:	**Mochamad Arief Budihardjo**, Syafrudin, Agus Jatnika Effendi, Syarif Hidayat, Candra Purnawan, Ayudya Izzati Dyah Lantasi, Fadel Iqbal Muhammad, Bimastyaji Surya Ramadan
Identifikasi Jurnal Ilmiah	:	a. Nama Jurnal : Journal of Environmental Management b. Volume/Nomor : Volume 277, 2021, Article 111417 c. Edisi (bulan/ tahun) : Oktober 2020 d. Penerbit : Elsevier e. Jumlah Halaman : 10 f. Jurnal URL : https://doi.org/10.1016/j.jenvman.2020.111417 g. Terindeks (jika ada) : Scopus h. Turnitin similarity : 8%
Kategori Publikasi (beri √ pada kategori yang tepat)	:	☑ **Jurnal Ilmiah Internasional Bereputasi** ☐ Jurnal Ilmiah Internasional ☐ Jurnal Ilmiah Nasional Terakreditasi ☐ Jurnal Ilmiah Nasional Tidak Terakreditasi DOAJ ☐ Jurnal Ilmiah Nasional Tidak Terakreditasi

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	Reviewer I	Reviewer II	
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b. Ruang lingkup dan kedalaman pembahasan (30%)	10	11,5	10,75
c. Kecukupan dan kemutahiran data/ informasi dan metodologi (30%)	12	12	12
d. Kelengkapan unsur dan kualitas penerbit (30%)	12	11,5	11,75
Total = (100%)	38	38,5	38,25
Kontribusi Pengusul (Penulis pertama dari 8 Penulis) = (60% 38,25) = 22,95			

Semarang, 5 Agustus 2021

Reviewer II

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C-2

LEMBAR HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
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Hasil Penilaian *Peer Review*

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	Internasional Bereputasi	Internasional	Nasional Terakreditasi	Nasional tidak Terakreditasi (DOAJ)	Nasional Tidak Terakreditasi	
a. Kelengkapan dan kesesuaian unsur isi jurnal (10%)	4					4
b. Ruang lingkup dan kedalaman pembahasan (30%)	12					10
c. Kecukupan dan kemutahiran data/ informasi dan metodologi (30%)	12					12
d. Kelengkapan unsur dan kualitas penerbit (30%)	12					12
Total = (100%)	40					38
Kontribusi Pengusul (Penulis pertama dari 8 Penulis) = (0,6 x 38) = 22,8						

Komentar Peer Review

1. Tentang kelengkapan dan kesesuaian unsur:
   Tulisan sudah lengkap sesuai dengan template sebagai artikel review pada Journal of Environmental Engineering yang terdiri dari judul, abstrak, pendahuluan, diskusi tentang SMFCs, kesimpulan, dan referensi. Artikel telah sesuai bidang ilmu pengusul/anggota penulis
2. Tentang ruang lingkup dan kedalaman pembahasan:
   Ini adalah review artikel yang membahas tentang *solid-phase microbial fuel cells* (SMFCs) sebagai alternatif teknologi untuk menghasilkan listrik dari pengolahan sampah yang ramah lingkungan serta konfigurasi optimum dan pengembangan reaktor *microbial fuel cell* (MFC). Data dan hasil dari penelitian terdahulu yang ditampilan cukup banyak dengan detail pembahasan yang sangat baik. Meskipun demikian, review artikel ini perlu lebih diimprove dengan critical assessment terhadap hasil-hasil yang telah dikembangkan pada bidang fuel cell. Secara umum isi masih sangat baik.
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Reviewer I

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LEMBAR HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
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a. Kelengkapan dan kesesuaian unsur isi jurnal (10%)	4					3.5
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c. Kecukupan dan kemutahiran data/ informasi dan metodologi (30%)	12					12
d. Kelengkapan unsur dan kualitas penerbit (30%)	12					11.5
Total = (100%)	40					38,5
Kontribusi Pengusul (Penulis pertama dari 8 Penulis) (0,6 x 38.5) = 23.1						

Komentar Peer Review

1. Tentang kelengkapan dan kesesuaian unsur:
   Kelengkapan dan kesesuaian sebagai *review article* sudah lengkap, terdiri dari abstract, introduction, diskusi tentang dasar solid microbial fuel cells (SMCs), factor yag mempengaruhi (SMCs), integrasi SMFCs pengolahan limbah padat lainnya, kesimpulan and referensi. Dengan unsur tersebut jurnal ilmiah ini dinilai sudah lengkap dan sesuai.

2. Tentang ruang lingkup dan kedalaman pembahasan:
   Artikel ini mereview tentang *solid-phase microbial fuel cells* (SMFCs) pada proses pengolahan limbah padat sebagai sumber energi. Artikel ini membahas tentang tantangan dan kesenjangan penelitian dan pengembangan SMFCs. Pembahasan yang dilakukan cukup mendalam dengan didukung dengan analysis dan kajian literatur yang cukup banyak.

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Semarang, 2 Agustus 2021
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Budihardjo M.A.[a], Syafrudin[a], Effendi A.J.[b], Hidayat S.[b], Purnawan C.[c], Lantasi A.I.D.[d], Muhammad F.I.[e], Ramadan B.S.[a]

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Technical evaluation and optimization of a mobile septage treatment unit

Aaron A. Forbis-Stokes, Arumugam Kalimuthu, Janani Ravindran, Marc A. Deshusses

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Review

Waste valorization using solid-phase microbial fuel cells (SMFCs): Recent trends and status

Mochamad Arief Budihardjo [a,*], Syafrudin [a], Agus Jatnika Effendi [b], Syarif Hidayat [b], Candra Purnawan [c], Ayudya Izzati Dyah Lantasi [d], Fadel Iqbal Muhammad [e], Bimastyaji Surya Ramadan [a]

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ARTICLE INFO

Keywords:
Anaerobic digestion
Compost
Mass transfer
Microbial fuel cells
Solid-phase

ABSTRACT

This review article discusses the use of solid waste processed in solid-phase microbial fuel cells (SMFCs) as a source of electrical energy. Microbial Fuel Cells (MFCs) are typically operated in the liquid phase because the ion transfer process is efficient in liquid media. Nevertheless, some researchers have considered the potential for MFCs in solid phases (particularly for treating solid waste). This has promise if several important factors are optimized, such as the type and amount of substrate, microorganism community, system configuration, and type and number of electrodes, which increases the amount of electricity generated. The critical factor that affects the SMFC performance is the efficiency of electron and proton transfer through solid media. However, this limitation may be overcome by electrode system enhancements and regular substrate mixing. The integration of SMFCs with other conventional solid waste treatments could be used to produce sustainable green energy. Although SMFCs produce relatively small amounts of energy compared with other waste-to-energy treatments, SMFCs are still promising to achieve zero-emission treatment. Therefore, this article addresses the challenges and fills the gaps in SMFC research and development.

1. Introduction

The increase of municipal solid waste generation is an issue faced by nearly all countries, due to the expansion of industrial activities and global development. In developing countries, almost 90% of municipal waste is transported directly to landfills without any intermediate treatment that could reduce the solid waste volume (Barik and Paul, 2017). This waste management activity contributes 5% to the total global greenhouse gas emissions. Recycling, effective waste treatment, and source-segregation are the primary strategies to reduce emissions and environmental impacts due to increased waste generation (Florio et al., 2019). Waste is considered to have a relatively large energy content such that waste-to-energy is considered a viable alternative (Chiu et al., 2016). Composting and anaerobic digestion are biological treatment technologies that have been used and explored extensively in various countries (Yu et al., 2015; Xin et al., 2018). However, conventional composting under aerobic conditions requires more energy for mixing and an air supply, which could produce vast amounts of leachate (Chu et al., 2019). Anaerobic composting, which is commonly known as anaerobic digestion, can be an alternative solution to convert solid waste into reusable energy and biofuel (Khudzari et al., 2016). Recent research has shown that anaerobic digestion has many constraints, such as a long residence time, a low purification of biomethane and its conversion to electricity, and a variety of safety issues, which makes this technology an imperfect solution for zero-discharge treatment (Xin et al., 2018).

Recently, microbial fuel cells (MFCs) were found to be an alternative treatment to generate electricity from waste (waste valorization) without intermediate treatment steps because anaerobic digestion

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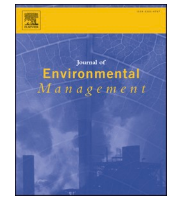

Research article

A high-resolution nitrate vulnerability assessment of sandy aquifers (DRASTIC-N)

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A R T I C L E I N F O

Keywords:
Groundwater vulnerability
Nitrate vulnerability
Redox interface
DRASTIC
SCANVA

A B S T R A C T

Groundwater protection against agricultural diffuse nitrate pollution is of paramount importance for safeguarding groundwater-dependent aquatic ecosystems and protecting human health by securing clean groundwater for drinking water production. Nitrate vulnerability assessment of aquifers is the core of a scientifically sound strategy for management and protection of groundwater by authorities. A multitude of methods exists for assessing intrinsic aquifer vulnerability. The objective of this paper is to develop a nitrate-specific groundwater vulnerability assessment method based on the globally recognized DRASTIC method, which was developed by the US Environmental Protection Agency in the 1980s. We propose a new method "DRASTIC-N" for assessing aquifer nitrate vulnerability, which for the first time expands the seven original geological and hydrogeological parameters with a geochemical parameter for redox condition. The development of DRASTIC-N is based on the longstanding Danish practice of performing detailed groundwater mapping based on dense sampling of geophysical, geological, and geochemical data. DRASTIC-N is compared to the widely used and documented Danish nitrate vulnerability assessment method SCANVA in a study area where the primary aquifer used for drinking water production is composed of heterogeneous sandy glacial deposits. Both SCANVA and DRASTIC-N result in vulnerability maps, which show similar patterns of nitrate vulnerability with a fair overall agreement of 71%. DRASTIC-N provides a framework for systematic and transparent application, which can facilitate stakeholder involvement and help authorities in groundwater protection and decision-making with regards to nitrate pollution. DRASTIC-N is suitable for nitrate vulnerability assessments of glacially deposited sandy aquifers, an abundant and important water resource worldwide, potentially threatened by nitrate pollution from anthropogenic activities.

1. Introduction

Groundwater protection is essential as groundwater is a valuable drinking water resource and because it discharges to vulnerable aquatic ecosystems. The Danish limit for nitrate (NO_3^-) in groundwater and drinking water (50 mg/L) follows the drinking water guideline of the World Health Organization (WHO), which is almost equal to the US Environmental Protection Agency's (US EPA) maximum contaminant level of 10 mg nitrogen (N) per L (EPA, 2016). This level is based on epidemiological evidence and aims to protect infants from the acute condition methemoglobinemia (WHO, 2011). However, lower threshold levels may be warranted for protecting sensitive aquatic ecosystems (Hinsby et al., 2012) and there is increasing evidence that the current drinking water guideline value may not adequately protect the general population against adverse chronic health effects (Espejo-Herrera et al., 2016; Schullehner et al., 2018; Temkin et al., 2019).

Environmental protection, and especially groundwater protection, has a high priority in Denmark, where the entire drinking water supply is based on groundwater (Hansen et al., 2017). Numerous waterworks and wells closed in the last 30 years because of nitrate pollution (Danish Economic Councils, 2015). Approximately 19% of Denmark was classified as a nitrate-vulnerable groundwater abstraction area (Danish Environmental Portal, 2015; Hansen et al., 2016). The Danish protection strategy demands remediation of groundwater pollution at the source. In regards to agricultural activities, this mainly concerns nitrate leaching. N-regulation of Danish agriculture, enforced by national and European

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Research article

Technical evaluation and optimization of a mobile septage treatment unit

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ARTICLE INFO

Keywords:
Onsite wastewater treatment
Septage
Ultrafiltration
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Mobile
Full-scale

ABSTRACT

A mobile septage treatment unit was built in India using readily available filters and membranes (mesh fabric, sand, granular activated carbon (GAC), microfilter, ultrafilter) and installed on the bed of a small truck. The target application was emptying of septic or sewage holding tanks and concentration of suspended solids while generating a liquid that could be discharged. The system was evaluated for operational and treatment performance while processing septage in the field at 108 sites in Tamil Nadu, India. After one phase of evaluation (Phase I), the system was improved and three replicate systems with slight modifications were fabricated for a second round of evaluation (Phase II) alongside the original, but modified unit. In Phase I, 105 m^3 of septage was processed at an average flow of 623 L h^{-1} and with high removal efficiencies: 83% chemical oxygen demand (COD), 75% total suspended solids (TSS), and 98.4% total coliform (TC). In Phase II, the original and three new systems combined treated 168 m^3 of septage. One of the new systems doubled in capacity and processed septage at an average flow of 2700 L h^{-1} while the other three averaged 1290 L h^{-1}. The removal efficiencies in Phase II were 80% COD, 81% TSS, and 99% TC averaged between the four systems. Pass through of soluble contaminants (e.g. soluble COD, NH_3–N) remain the primary challenge for treatment performance. Success may be limited with some septage due to seasonality, location, or septage age, and further validation and optimization may be necessary. However, the septage in this study was treated to local standards, and the system offers a method of onsite treatment while reducing the need of costly and often inefficient septage emptying services. Further, the system can be produced at a cost competitive to traditional septage hauling trucks.

1. Introduction

The 2011 India census found that 38.2% of urban households with toilets are connected to septic tanks (Government of India, 2011). This percentage increases to greater than 62% for cities with less than one million residents. Under the Swachh Bharat Mission, 21% of already constructed toilets in rural households are connected to septic tanks, and 24% of those under construction will be connected to septic tanks (Water Aid, 2017). Based upon these findings, India's wastewater framework is heavily reliant on septic tank services. Septic tanks in India's urban and peri-urban regions typically do not have liquid overflows to soak pits or soil absorption fields, as seen in many other locations, but are large vaults that are emptied when full. Septic truck operators are hired to empty these tanks once full, with the purpose of transporting contents to tipping stations or sewage treatment plants. However, it is often found that septic contents do not arrive at these treatment stations. The distance to travel, fuel cost, time demand and expenses all motivate emptiers to dump their contents in alternative, nearby locations without providing sanitary treatment of the septic truck contents. Evidence of this indiscriminate dumping is seen in the global city-wide excreta flow diagrams that show as much as, or more than 50% of collected septage is not treated in cities of India or many other countries (SuSanA, 2020). Two excreta flow diagram examples in India include the major city of Chennai (population 7.1 million) and smaller city of Kochi (population 2.1 million). Chennai's excreta flow diagram shows 58% of population using onsite sanitation of which 66% requires emptying, and only 61% of that is treated (Narayan and Ramachandran, 2019). Meanwhile, 78% of Kochi's population uses onsite sanitation, of which only 14% is treated (Roeder, 2016).

Due to these issues, decentralized wastewater/sewage treatment has garnered greater attention lately (Capodaglio et al., 2017; Chirisa et al., 2017; Singh et al., 2015; UN-Habitat and Asian Institute of Technology

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