water

MDPI

Editorial

Special Issue: Water Quality Engineering and Wastewater Treatment II

Yung-Tse Hung [1], Rehab O. Abdel Rahman [2,*], Hamidi Abdul Aziz [3], Issam A. Al-Khatib [4] and Tsuyoshi Imai [5]

[1] Department of Civil and Environmental Engineering, Cleveland State University, Cleveland, OH 44115, USA
[2] Hot Laboratory Center, Atomic Energy Authority of Egypt, Inshas, Cairo P.O. Box 13759, Egypt
[3] School of Civil Engineering, Engineering Campus, Universiti Sains Malaysia, Nibong Tebal 14300, Pulau Pinang, Malaysia
[4] Institute of Environmental and Water Studies, Faculty of Graduate Studies, Birzeit University, Birzeit P.O. Box 14, West Bank, Palestine
[5] Graduate School of Sciences and Technology for Innovation, Yamaguchi University, 2-16-1, Tokiwadai, Ube City 755-8611, Yamaguchi, Japan
* Correspondence: alaarehab@yahoo.com

Water is an essential natural compound on earth; all life forms on our planet need water to function properly. The limited amount of easily accessible fresh water and its necessity for life continuation are the main drives to identify the provision of clean water and pollution control among the Sustainable Development Goals. Acceptable water quality and improved wastewater management play important roles in reaching these goals. This Special Issue includes 21 papers (this editorial, 18 research papers, and 3 review papers) [1–21]. The main focus of this Special Issue is wastewater treatment, and the presented topics include waste-to-energy plants, leachate treatment, water management, chemical, electrochemical and biological treatment of wastewater, low-impact technology, and municipal water infrastructure [1–4,6,13,19,21], in addition to papers that address water quality [5,9,11].

Four published research papers in this Special Issue aimed to improve and understand/model the technological processes used in waste-to-energy plants, namely: microbial fuel cells, anaerobic reactors, and anaerobic–aerobic reactors [2,3,17,18]. The environmental transmission of viruses within microbial fuel cells was studied, and the kinetics of the process was traced over 15 h to evaluate the effect of the physicochemical and electrochemical parameters and by calculating the logarithmic reduction value and reduction efficiency [2]. The enhancement of power generation and organic contaminant removal in a double anode chamber–designed dual chamber microbial fuel cell (DAC-DCMFC) was investigated, and the study concluded that compared to the closer design and configuration of other multiple anode chambers reported in the literature, the use of DAC-DCMFC increases the power density by 1.9 times [3]. Modeling and optimization of biogas production during the biological treatment of food wastes and sewage sludge was carried out, and an economic analysis was conducted, which proved the economical feasibility for biogas production on a larger scale using food waste and sewage sludge [17]. The modeling of the performance of an integrated anaerobic–aerobic bioreactor to produce biogas from the treatment of palm oil mill effluent was addressed using an artificial neural network, and the study concluded that the inlet COD is the most influential input parameter that affects methane yield [18].

The feasibility of using tin tetrachloride with rubber seed and polyacrylamide to improve the performance of the coagulation process in treating landfill leachate was studied, and the study concluded that the application of the polymer coagulant improved sludge properties in terms of settling rate and floc size and reduced the coagulant dose without impacting removal performance [4].

Citation: Hung, Y.-T.; Abdel Rahman, R.O.; Aziz, H.A.; Al-Khatib, I.A.; Imai, T. Special Issue: Water Quality Engineering and Wastewater Treatment II. *Water* **2023**, *15*, 379. https://doi.org/10.3390/w15030379

Received: 27 December 2022
Revised: 5 January 2023
Accepted: 13 January 2023
Published: 17 January 2023

The presented water management research in this Special Issue aimed to assess natural water quality in different areas, i.e., Brazil, Palestine, and China. These investigations addressed the spatial variability in the water quality in surface and groundwater and surface water discharge modeling [5,9,11]. The spatial and temporal variation in the concentration of nitrogen and phosphorus organic and inorganic species in the deep tropical lake Paranoa-DF (Brazil) was traced, and the study concluded that agricultural activities and wastewater treatment plants determine the trophic state and the degradation of the water quality in the lake [5]. In another research, the quality of the groundwater in the West Bank, Palestine, was assessed in terms of microbiological and physicochemical properties; the study suggested that the sources of this pollution were the inadequate disposal of untreated wastewater and/or agricultural activities [9]. Finally, data were collected from Xingshan station in Xiangxi River, China, for three years and were used to develop a regression tree ensemble model (RET) to improve discharge simulation accuracy [11].

The use of electrochemical oxidation and biological treatment in the degradation of different wastewater streams were addressed to understand the degradation of the nonsteroidal anti-inflammatory drug Naproxen [6], identify the effect of the increased organic loading rate on the performance of anaerobic sequencing batch reactor in treating biodiesel wastewater [7], investigate the anaerobic digestion of recycled paper mill effluent using a modified anaerobic hybrid baffled reactor [10], and develop a start-up methodology for a full-scale anaerobic–aerobic sewage treatment system [20].

The use of constructed wetland and low-impact development technologies, such as permeable pavement, in the treatment of swine wastewater, domestic sewage and storm waters, were addressed in three research papers [12,13,15]. In this respect, the modeling of the organic matter removal kinetics from municipal sewerage in horizontal subsurface flow CWs was carried out using a conventional first-order model and sigmoidal k-n model [12]. In another work, three CWs were built, one used as control and two cultivated with Polygonum punctatum and Chrysopogonzizanioides [15]. Finally, the potential use of permeable pavement for pollutant removal from varying strengths of stormwater in arid and semi-arid regions was presented in a research paper [13].

Problems associated with the use of different technologies within the municipal wastewater infrastructure were addressed by analyzing the needs and perception of using cesspits in non-sewered rural areas [16], identifying the impacts of electric bidets [14], controlling hydrogen sulfide in the sewer system [19], and reviewing recent research in developing IoT-based solutions to monitor smart water tanks [8].

Two review articles on the merits, demerits, and future perspectives of conventional wastewater treatment technologies [21] and the advances in using nano-Zeolite in water and tertiary wastewater treatment are also presented in this Special Issue [1].

Author Contributions: Conceptualization and writing—original draft preparation, Y.-T.H. and R.O.A.R.; writing—review and editing, all authors. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Rahman, R.O.A.; El-Kamash, A.M.; Hung, Y.-T. Applications of Nano-Zeolite in Wastewater Treatment: An Overview. *Water* **2022**, *14*, 137. [CrossRef]
2. Alzate-Gaviria, L.; Tapia-Tussell, R.; Domínguez-Maldonado, J.; Chable-Villacis, R.; González, G.R.; Hernández-Zepeda, C. Removal of Coliphage MS2 Using a Microbial Fuel Cell Stack. *Water* **2021**, *13*, 2756. [CrossRef]
3. Samudro, G.; Imai, T.; Hung, Y.-T. Enhancement of Power Generation and Organic Removal in Double Anode Chamber Designed Dual-Chamber Microbial Fuel Cell (DAC-DCMFC). *Water* **2021**, *13*, 2941. [CrossRef]
4. Ramli, S.F.; Aziz, H.A.; Omar, F.M.; Yusoff, M.S.; Halim, H.; Kamaruddin, M.A.; Ariffin, K.S.; Hung, Y.-T. Reduction of COD and Highly Coloured Mature Landfill Leachate by Tin Tetrachloride with Rubber Seed and Polyacrylamide. *Water* **2021**, *13*, 3062. [CrossRef]
5. da Silva, D.B.; Bellotto, V.R.; Barbosa, J.D.S.B.; Lima, T.B. Spatiotemporal Variation on Water Quality and Trophic State of a Tropical Urban Reservoir: A Case Study of the Lake Paranoá-DF, Brazil. *Water* **2021**, *13*, 3314. [CrossRef]

6. Zavala, M.L.; Vega, D.A. Use of Stainless-Steel Electrodes on the Electrochemical Oxidation of Naproxen and its Transformation Products in Surface Water. *Water* **2021**, *13*, 3604. [CrossRef]
7. Pereira, E.L.; Borges, A.C.; da Silva, G.J. Effect of the Progressive Increase of Organic Loading Rate in an Anaerobic Sequencing Batch Reactor for Biodiesel Wastewater Treatment. *Water* **2022**, *14*, 223. [CrossRef]
8. Jan, F.; Min-Allah, N.; Saeed, S.; Iqbal, S.Z.; Ahmed, R. IoT-Based Solutions to Monitor Water Level, Leakage, and Motor Control for Smart Water Tanks. *Water* **2022**, *14*, 309. [CrossRef]
9. Mahmoud, N.; Zayed, O.; Petrusevski, B. Groundwater Quality of Drinking Water Wells in the West Bank, Palestine. *Water* **2022**, *14*, 377. [CrossRef]
10. Hassan, S.R.; Hung, Y.-T.; Dahlan, I.; Aziz, H.A. Kinetic Study of the Anaerobic Digestion of Recycled Paper Mill Effluent (RPME) by Using a Novel Modified Anaerobic Hybrid Baffled (MAHB) Reactor. *Water* **2022**, *14*, 390. [CrossRef]
11. Zhai, A.; Fan, G.; Ding, X.; Huang, G. Regression Tree Ensemble Rainfall–Runoff Forecasting Model and Its Application to Xiangxi River, China. *Water* **2022**, *14*, 463. [CrossRef]
12. Soares, B.S.; Borges, A.C.; de Matos, A.T.; Barbosa, R.B.G.; e Silva, F.F. Exploring the Removal of Organic Matter in Constructed Wetlands Using First Order Kinetic Models. *Water* **2022**, *14*, 472. [CrossRef]
13. Shafiquzzaman; Alqarawi, S.M.A.; Haider, H.; Rafiquzzaman; Almoshaogeh, M.; Alharbi, F.; El-Ghoul, Y. Evaluating Permeable Clay Brick Pavement for Pollutant Removal from Varying Strength Stormwaters in Arid Regions. *Water* **2022**, *14*, 491. [CrossRef]
14. Toyosada, K.; Xu, L. The Impact of Electric Bidet Diffusion on Municipal Water. *Water* **2022**, *14*, 639. [CrossRef]
15. Ramos, N.D.F.S.; Borges, A.C.; Coimbra, E.C.L.; Gonçalves, G.C.; Colares, A.P.F.; de Matos, A.T. Swine Wastewater Treatment in Constructed Wetland Systems: Hydraulic and Kinetic Modeling. *Water* **2022**, *14*, 681. [CrossRef]
16. Thaher, R.A.; Mahmoud, N.; Al-Khatib, I.A.; Hung, Y.-T. Cesspits as Onsite Sanitation Facilities in the Non-Sewered Palestinian Rural Areas: Users' Satisfaction, Needs and Perception. *Water* **2022**, *14*, 849. [CrossRef]
17. Cheong, W.L.; Chan, Y.J.; Tiong, T.J.; Chong, W.C.; Kiatkittipong, W.; Kiatkittipong, K.; Mohamad, M.; Daud, H.; Suryawan, I.W.K.; Sari, M.M.; et al. Anaerobic Co-Digestion of Food Waste with Sewage Sludge: Simulation and Optimization for Maximum Biogas Production. *Water* **2022**, *14*, 1075. [CrossRef]
18. Chen, W.-Y.; Chan, Y.J.; Lim, J.W.; Liew, C.S.; Mohamad, M.; Ho, C.-D.; Usman, A.; Lisak, G.; Hara, H.; Tan, W.-N. Artificial Neural Network (ANN) Modelling for Biogas Production in Pre-Commercialized Integrated Anaerobic-Aerobic Bioreactors (IAAB). *Water* **2022**, *14*, 1410. [CrossRef]
19. Imai, T.; Vo, H.T.; Fukushima, M.; Suzuki, T.; Sakuma, H.; Hitomi, T.; Hung, Y.-T. Application of Conductive Concrete as a Microbial Fuel Cell to Control H_2S Emission for Mitigating Sewer Corrosion. *Water* **2022**, *14*, 3454. [CrossRef]
20. Díaz-Gómez, J.; Pérez-Vidal, A.; Vargas-Nuncira, D.; Usaquén-Perilla, O.; Jiménez-Daza, X.; Rodríguez, C. Start-Up Evaluation of a Full-Scale Wastewater Treatment Plant Consisting of a UASB Reactor Followed by Activated Sludge. *Water* **2022**, *14*, 4034. [CrossRef]
21. Koul, B.; Yadav, D.; Singh, S.; Kumar, M.; Song, M. Insights into the Domestic Wastewater Treatment (DWWT) Regimes: A Review. *Water* **2022**, *14*, 3542. [CrossRef]