

Application of Coconut Fiber Biofilm Treatment System to Wastewater Treatment: Development of Synthetic Leachate

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One of the main causes of water pollution is the leachate from waste disposal sites with an improper operation. The objective of this study is to assess the utilization of local-available biomass resources for wastewater treatment and to study the adaptability of the developed wastewater treatment system for the present circumstances in Sri Lanka. The experiment container is designed as 0.012m³ in volume. Pile of strings of coconut fibers from Sri Lanka will be used as a biofilm agent. Experiment will be carried out synthetic leachate at a rate of 0.057m³/day (0.012m³/7days) with one-week retention time and 0.029m³/day (0.006 m³ /14day) with two-week retention time with different fiber density. Using synthetic leachate, provides a relatively constant influent source concentration of leachate constituents to the microcosm system. The two type of synthetic leachate was prepared to meet the following objectives: 1) to be more representative of real leachate in Sri Lanka, 2) the medium should be stable during the operation of experiment (2 week), 3) low BOD/COD ratio. Prepared Synthetic leachates were tested for biodegradability. Variation of Dissolved oxygen (DO), pH, and ORP (Oxidation Reduction Potential) profiles are almost constant with time. Chemical oxygen demand (COD) of leachate 1 is 2.09x10⁴ mg/l and leachate 2 is 1.92x10⁴ mg/l. In the case of leachate 1 and leachate 2, COD values were not significantly change up to 21 days and 34 days respectively. After that, COD value is significantly changed. It could be assumed that hardly degradable complexes may be formed with increasing time. In order to measure BOD values in a synthetic leachate 0.01g of landfill capping soil was added, as a seeding material. BOD value of both type of leachate is decreases as the time increases. This indicated that microorganism would depredate readily degradable organic and inorganic compounds. Total Organic Carbon (TOC), Inorganic Carbon (IC) and TC (Total carbon) values are almost constant with time. BOD/COD ratio is decreases with the time. It could be assumed that the biodegradability of leachate is decreases with time.

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