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Effects of hydraulic retention time, sewage temperature and effluent recycling on efficiency of up-flow anaerobic filter reactor in treating rural domestic sewage

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Population expansion and advances in socio-economic standards of rural communities had lead to serious environmental agitation. This paper assessed the effects of hydraulic retention time (HRT), sewage temperature and effluent recycling on treatment performance of up-flow anaerobic filter (UAF). Two experimental operations were performed; the first experiment was performed for four months with HRTs of 24, 48, 72 and 96 hours, temperature of 23.5°C, 25.4°C, 27.6°C and 29.3°C and with effluent recycling ratios of 1:1, 1:2, and 2:1. The second experimental operations were also conducted for four months with HRTs of 48, 72, 96 and 120 hours; temperatures of 10°C, 13°C, 15°C and 18°C; and no effluent recycling. The first experimental operations revealed removal rates of 67% to 77% for COD, 61% to 66% for TN, and 36% to 51% for TP. In the second experimental operations, the removal rates varied from 30% to 36% for COD, 31% to 35% for TN and 10% to 15% for TP. The average gas production rates were 4.5 L/d and 1.3 L/d for the first and second experimental operations respectively. High rate of gas production in the first operations was due to the applied effluent recycling and high temperature as compared to the second operations with no effluent recycling and low temperature. The best removal rate was obtained for an optimum HRT of 96 hours, temperature of 29.3°C and effluent recycling ratio of 2:1. The results revealed that, the removal efficiency of UAF reactor was directly influenced by HRT, temperature and effluent recycling.

Biography

John Leju Celestino Ladu has completed his PhD from Southeast University and currently doing his Post-doctoral studies in Southeast University. He worked as Assistant Professor in University of Juba, College of Natural Resources and Environmental Studies and also as Environmental Consultant in private and government institutions of the Republic of South Sudan. He has published more than 15 papers in reputed journals and has been serving as an editor for several journals.

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