Performance and Comparison of Wastewater Treatment Systems

in Thimphu, Bhutan

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Abstract

The main objective of this research was to provide an evaluation of the performance of the two technologies (Sequential Batch Reactor and Waste Stabilization Pond) employed in the centralized treatment system of Babesa, Thimphu, the capital city of Bhutan. The performance was analyzed based on the respective plant's flow capacity, pH of effluent, and removal of Total Suspended Solids (TSS), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Fecal Coliform (FC), as well as the capital cost and sustainability of the treatment system. While the WSP removal efficiency (R.E) was marginally higher than SBR, the effluent failed to meet discharge standards. However, the SBR effluent samples analyzed from April 2022 to August 2022 revealed a consistent and successful removal of TSS, BOD, COD, and FC with the effluent meeting the discharge standards set by both the National Environment Commission (NEC) and the contract. Not only was SBR found to be more feasible economically and capacity wise, but the success of the technology was a function of its compatibility with Thimphu's specific characteristics. The conclusions of this study hopes to encourage a more rigorous consideration of treatment options to invest in Bhutan's growing urban cities in the future, as well as a redefinition in how we evaluate the success of wastewater treatment systems.