

A Study on the Treatment of Municipal Waste Water Using Sequencing Batch Reactor

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Abstract : Sequencing batch reactor process is a suspended growth process operating under non-steady state conditions which utilizes a fill and draw reactor with complete mixing during the batch reaction step (after filling) and where the subsequent steps of aeration and clarification occur in the same tank. All sequencing batch reactor systems have five steps in common, which are carried out in sequence as follows, (1) fill (2) react (3) settle (sedimentation/clarification) (4) draw (decant) and (5) idle. The study was carried out in a sequencing batch reactor of dimensions 44cmx30cmx70cm with a working volume of 40 L. Mechanical stirrer of 100 rpm was used to provide continuous mixing in the react period and oxygen was supplied by fish tank aerators. The duration of a complete cycle of sequencing batch reactor was 8 hours. The cycle period was divided into different phases in sequence as follows-0.25 hours fill phase, 6 hours react period, 1 hour settling phase, 0.5 hours decant period and 0.25 hours idle phase. The study consisted of two runs, run 1 and run 2. Run 1 consisted of 6 hours aerobic react period and run 2 consisted of 3 hours aerobic react period followed by 3 hours anoxic react period. The influent wastewater used for the study had COD, BOD, NH₃-N and TKN concentrations of 308.03±48.94 mg/L, 100.36±22.05 mg/L, 14.12±1.18 mg/L, and 24.72±2.21 mg/L respectively. Run 1 had an average COD removal efficiency of 41.28%, BOD removal efficiency of 56.25%, NH₃-N removal efficiency of 86.19% and TKN removal efficiency of 54.4%. Run 2 had an average COD removal efficiency of 63.19%, BOD removal efficiency of 73.85%, NH₃-N removal efficiency of 90.74% and TKN removal efficiency of 65.25%. It was observed that run 2 gave better performance than run 1 in the removal of COD, BOD and TKN.

Keywords : municipal waste water, aerobic, anoxic, sequencing batch reactor

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020