

Efficiency of a Wastewater Treatment Plant in the City of Nairobi

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Abstract

Efficiency of a wastewater treatment plant in the city of Nairobi was evaluated by investigating water quality parameters. A total of 48 water samples were analyzed from the plant in three sites namely; Inlet (I), Clarifier (C) and Outlet (O) to determine physico-chemical, inorganic ions, oil & grease, bacterial and heavy metals. The physico-chemical parameters analyzed included settleable solids (SS), chemical oxygen demand (COD), and biochemical oxygen demand after five days (BOD₅). The results for sampling sites I, C and O ranged from; settleable solids (6.5-15.7 ml/l, 0.2- 0.9 ml/l, 0.25- 1.9 ml/l respectively); COD (600- 4000 mg/l, 80- 120 mg/l, 70-115 mg/l respectively); BOD₅ (310-650 mg/l, 60-290 mg/l, 60-210 mg/l respectively); nitrates (0.158-1.437 mg/l, 0.167-1.178 mg/l, 0.132-1.00 mg/l respectively); phosphates (76-200 mg/l, 82.5-179 mg/l, 86-127 mg/l respectively); oil and grease (1.012- 1.901 mg/l, 1.1246-1.349 mg/l, 0.923- 1.032 mg/l respectively); Total coliforms (253,000- 590,000 counts/100 ml, 180,000 -561,000 counts/100 ml, 160,000- 783,000 counts/100 ml respectively). Percentage reduction efficiency for settleable solids was found to be in the range of 74.7- 96.7 % while COD and BOD₅ had percentage reduction efficiency ranging from 88.3- 98% and 43.6 - 84.5 % respectively. Nitrates and phosphates had percentage reduction efficiency of the range 17-36.5 and 13.2- 36.5 respectively. Oil and grease had percentage reduction efficiency in the range of 14.4 - 92.6 % while total coliforms had percentage reduction efficiency of 32.7 - 66.9 %.

Keywords: Wastewater; influent; effluent; efficiency; clarifier.

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