

Analysis of confectionery industrial wastewater and evaluation of the performance of a wastewater treatment plant: A case study

The study was conducted to analyse Confectionery Wastewater and to evaluate the efficiency of a wastewater treatment plant in a leading confectionery manufacturing industry. The secondary treatment operation units of the wastewater treatment plant comprise of an anaerobic and two modified RBC systems. The maximum daily flow rate was 18m³.

Physiochemical parameters analysed were Biological Oxygen Demand (BOD₅), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Total Dissolved Solids (TDS), and pH. In addition to qualitative analysis of carbohydrates, microorganisms from the effluent were isolated and identified using standard identification methods. Grab samples from each treatment unit were used for the analysis.

The values of BOD₅ and COD of the influent ranged from 3,721.29 mg/L to 16,458.79 mg/L and, 12,420 mg/L to 23,187.20 mg/L respectively. The influent had a SS range of 0.21 mg/L to 8.62 mg/L, TDS range of 2.06 mg/L to 4.80 mg/L and PH range of 4.10 to 6.72. After anaerobic treatment, the BOD₅ ranged from 343.55 mg/L to 781.73 mg/L and the COD ranged from 4,215.00 to 9,593.60 mg/L. Anaerobic treatment unit had a SS ranged of 0.05 to 4.01 mg/L, TDS range of 1.11 to 3.65 and PH range of 5.16 to 7.15. End of aerobic treatment the BOD₅ value ranged from 200.12 to 601.41 mg/L, whilst the COD ranged from 2,120.80 to 6,307.30 mg/L. The SS value ranged from 0.03 to 2.57 mg/L and TDS range of 1.01 mg/L to 3.02 mg/L and a pH value range of 7.12 to 8.70. The final discharge had BOD₅ and COD values ranging from 164.78 to 382.47 mg/L and 908.0 to 2,854.56 mg/L. The SS TDS and pH value ranges of the final discharge were 0.05 to 3.67 mg/L, 1.00 to 3.67 and 6.01 to 8.36 mg/L. Although in general terms the BOD value is lesser than that of COD, it was observed that in certain instances the BOD₅ was higher. Among thirty-seven isolates, there were thirty-five Bacteria and two Yeast species. Present study indicated the overall efficiency of the Wastewater Treatment Plant ranged from 98% to 9% and 52% to 92% in terms of its reduction of BOD and COD, although the actual values of the treated effluent did not fall within the stipulated standards of CEA.