ABSTRACT

Investigation on the dairy wastewater treatment were undertaken at ambient temperature in 11 Liters (L) effective volume of laboratory – scale Upflow Anaerobic Sludge Blanket (UASB) reactor receiving an average influent Chemical Oxygen Demand (COD) of 2100 mg/L for 3 months of 24 hours(h), Hydraulic Retention Time (HRT). The feeds of the synthetic dairy wastewater were operated with the 4 HRTs of 12 hours, 16 hours, 20 hours and 24 hours at the equivalent to the Organic Loading Rates (OLRs) of 1.20 Kg COD/m$^3$.d - 7.20 Kg COD/m$^3$.d, 0.9 Kg COD/m$^3$.d - 5.40 Kg COD/m$^3$.d, 0.72 Kg COD/m$^3$.d - 4.32 Kg COD/m$^3$.d and 0.60 Kg COD/m$^3$.d - 3.60 Kg COD/m$^3$.d respectively. After the steady state condition was reached, which took about 2 months, the effluent quality parameter were sampled and analysed to quantify the treatment efficiencies.

The following removal efficiencies could be observed COD = 73 - 94.33%, Total Solids (TS) = 50.04 - 56.66%, Total Dissolved Solids (TDS) = 45.55 - 70.63%, Total Nitrogen (TN) = 66 - 86.67% and Total Phosphorous (TP) = 72 - 94%. The maximum bio gas production rate was = 383 L/kg COD removed with 260 L of methane gas. The estimation of biogas production was analysed using Statistical Package for Social Science (SPSS) 20 software and
Artificial Neural Network (ANN) software models and the results predicted coincide well with the experimental results. The overall result obtained from this investigation indicated that the UASB can be used for biogas production, COD, TS, TN and TP removal from dairy wastewater treatment as well.