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RUKCHANOK KHURBOOT : MAXIMUM SYSTEM LOADING AND  
RECOVERY CAPACITIES OF THE SEQUENCING BATCH REACTOR IN THE REMOVAL  
OF ORGANICS NITROGEN AND PHOSPHORUS FROM DOMESTIC WASTEWATER.

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The objectives of this research were to study the maximum system loading and recovery capacities of the sequencing batch reactor in the removal of organics, nitrogen and phosphorus from domestic wastewater. The system was composed of three similar acrylic plastic sequencing batch reactors (SBR). Each reactor was completely sealed with an actual volume of 20 liters and a 24 hours operating cycle. The experiment was divided into two phases, step load up and step load reduction.

The results showed that the COD, TKN, TP removal efficiencies and the organic loading rates were positively correlated ( $p < 0.001$ ). The COD, TKN and TP removal efficiencies were 95.27%, 88.94 % and 51.92%, respectively, at the maximum system loading rate 0.63-0.66 kg COD/m<sup>3</sup>-day. In addition, the system was recovered with the COD, TKN and TP removal efficiencies of 95.99%, 95.53% and 95.15%, respectively, at the step-loading reduction from 0.63-0.66 to 0.23-0.26 kg COD/m<sup>3</sup> - day.

However, when one of the systems was loaded up to 0.73-0.79 kg COD/m<sup>3</sup> - day, the COD, TKN and TP removal efficiencies went down to 93.31%, 77.72% and 43.43%, respectively (serving as the failure load). After this failure loading, when the system was recovered by using step-load reduction from the failure load to the loading of 0.13-0.16 kg COD/m<sup>3</sup>-day (initial load) it was found that the COD, TKN and TP removal efficiencies were 95.69%, 46.13% and 93.94%, respectively. In conclusion, the sequencing batch reactor can recover itself at the maximum loading of 0.63-0.66 kg COD/m<sup>3</sup>-day. But, at the failure loading of 0.73-0.79 kg COD/m<sup>3</sup> - day, the system can be recovered only for COD and TP removal efficiencies, not for the TKN one.