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The Effects of Hydraulic Retention Time on the Sludge Characteristics and Effluent Quality in an Aerobic Suspension Sequencing Batch Reactor

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Abstract : This study was performed to optimise the hydraulic retention time (HRT) and study its effects on the sludge characteristics and the effluent quality in an aerobic suspension sequencing batch reactor (ASSBR) treating synthetic wastewater. The results showed that increasing the HRT from 6 h to 12 h significantly improved the COD and Nitrate removal efficiency; it was increased from 78.7% - 75.7% to 94.7% – 97% for COD and Nitrate respectively. However, increasing the HRT from 12 h to 18 h reduced the COD and Nitrate removal efficiency from 94.7% - 97% to 91.1% – 94.4% respectively. Moreover, Increasing the HRT from 18 h to 24 h did not affect the COD and Nitrate removal efficiency. Sludge volume index (SVI) was used to monitor the sludge settling performance. The results showed a direct relationship between the HRT and SVI value. Increasing the HRT from 6 h to 12 h led to decrease the SVI value from 123 ml/g to 82.5 ml/g, and then it remained constant despite of increasing the HRT from 12 h to 18 h and to 24 h. The results obtained from this study showed that the HRT of 12 h was better for COD and Nitrate removal and a good settling performance occurred during that range.

Keywords : COD, hydraulic retention time, nitrate, sequencing batch reactor, sludge characteristics
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