



## Minimization of sludge production in an integrated UASB–continuous flow sequencing batch reactor system

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### ABSTRACT

A pilot plant consisting of a combined up-flow anaerobic sludge blanket (UASB) and a continuous flow sequencing batch reactor (cSBR) was tested for treating domestic wastewater. After the start-up, the system was operated for 115 d at a retention time of 5.7 h in the UASB reactor and a cycle time of 8 h in the cSBR. The efficiency of the removal of the average chemical oxygen demand (COD) and the total suspended solids (TSS) in the UASB reactor were 48% and 46%, respectively. The overall average removal efficiencies for the COD, TSS, and ammonia in the system were 85%, 87%, and 82%, respectively. The system was optimized for sludge production and tested for approximately 120 d for sludge cycling between the cSBR and the inlet of the UASB. In comparison with sludge production at a solids retention time of 8.6 d, the implementation of this strategy resulted in an average 89% reduction in sludge production and a 32% increase in biogas production. No effect on the removal efficiencies of COD, TSS, and ammonia was seen during the sludge cycling process, which ran for more than 4 months. The findings indicate that the scheme proposed in this study could be a promising, cost-effective option for wastewater treatment in small communities and decentralized systems.

*Keywords:* Up-flow anaerobic sludge blanket; Continuous flow sequencing batch reactor; Sludge reduction; Domestic wastewater treatment

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