

# **CHANGE IN SLUDGE SETTLING AND FILTRATION PROPERTIES AND MEMBRANE FOULING TRENDS IN MBR ACTIVATED SLUDGE SYSTEMS OPERATED AT DIFFERENT SOLIDS AND HYDRAULIC RETENTION TIMES**

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## **Abstract**

Membrane bioreactor (MBR) activated sludge process is increasingly used in wastewater treatment due to its excellence in solid-liquid separation and superior effluent quality, smaller bioreactor volume and foot print. However, operational issues such as membrane fouling and sludge bulking affect its broad applications. As solids retention time (SRT) and hydraulic retention time (HRT) are the most important operating parameters in activated sludge systems, this research determined the effect of different SRTs (180 d, 90 d and 45 d) and HRTs (24 h, 12 h, and 6 h) on the change in sludge settling and filtration properties and membrane fouling trends while keeping the SRT/HRT ratio constant throughout the study period. The biomass concentrations increased from about 8,000 to 10,000 mg COD/L as SRT and HRT decreased proportionally. As SRT decreased to 45 d and HTR decreased to 6 h, significant sludge bulking and poor filtration with high Time to Filter (TTF) values were observed, largely due to the operation at low DO concentrations under high organic loading conditions. However, the system recovered in about 50 d after correction of low DO concentrations in the MBR.