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The degradation of methyl orange and membrane fouling behavior in anaerobic baffled membrane bioreactor

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Abstract

To identify wastewater treatment performance and evaluate membrane's filtration behavior, the artificial azo dye methyl orange wastewater was treated via anaerobic baffled membrane bioreactor (ABMBR). After 4 cells of anaerobic treatment, the methyl orange was discolored completely with hydraulic retention time (HRT) of 17.20 hours or 15.24 hours, although the removal of total organic carbon (TOC) was not obvious. There was about 70% of TOC could be removed after MBR treatment even with shorter HRT. There were 7 kinds of identified intermediates from anaerobic and aerobic treatment processes, which indicated that there were two degradation pathways including demethylation and desulfonation. The operation time of this system lasted for 110 days under stable condition with only 2 times of membrane cleaning, because only 0.19-0.32 g_{MLSS}/m² of filter cake was accumulated on membrane surface. The zeta potential of solid surface analysis was used to identify membrane inorganic fouling successfully in this study because the zeta potential was changed regularly with organic and inorganic foulants removal processes.

Key words: anaerobic baffled reactor; membrane bioreactor; degradation pathway;

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