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Sludge reduction and microbial structures of aerobic, micro-aerobic and anaerobic side-stream reactor coupled membrane bioreactors

Hongjian Pang^a, Zhen Zhou^{a,c,*}, Tianhao Niu^a, Lu-Man Jiang^a, Guang Chen^b, Biao Xu^a,
Lingyan Jiang^b, Zhan Qiu^b

^a College of Environmental and Chemical Engineering, Shanghai University of Electric Power, Shanghai 200090, China

^b Shanghai Chentou Wastewater Treatment Co., Ltd, Shanghai 201203, China

^c Shanghai Institute of Pollution Control and Ecological Security, Shanghai, 200092, China

Abstract: An anoxic/oxic membrane bioreactor (MBR) and three side-stream reactor (SSR) coupled membrane bioreactors were operated in parallel to investigate effects of dissolved oxygen (DO) level in SSR on sludge reduction and microbial community structure of SSR-MBRs. The four MBRs were equally efficient in COD and ammonium nitrogen removal. The anaerobic and micro-aerobic SSR favored nitrogen removal through denitrification, simultaneous nitrification and denitrification and autochthonous substrate release as carbon source. The micro-aerobic SSR achieved greatly higher sludge reduction efficiency (61.1%) than anaerobic (37.3%) and aerobic SSR (7.9%). Micro-aerobic SSR obtained the highest endogenous decay constant (0.035 d^{-1}) compared to anaerobic (0.023 d^{-1}) and aerobic SSR (0.015 d^{-1}). High-throughput sequencing results revealed that anaerobic SSR enriched hydrolytic and fermentative

* Corresponding author. *E-mail address:* zhouzhen@shiep.edu.cn (Z. Zhou).

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