Electronic Supplementary Material (ESI) for Environmental Science: Water Research & Technology.

Membrane fouling amelioration through a pseudo dead-end filtration coupled with transmembrane pressure (TMP) set-point control in anaerobic membrane bioreactor for municipal wastewater treatment

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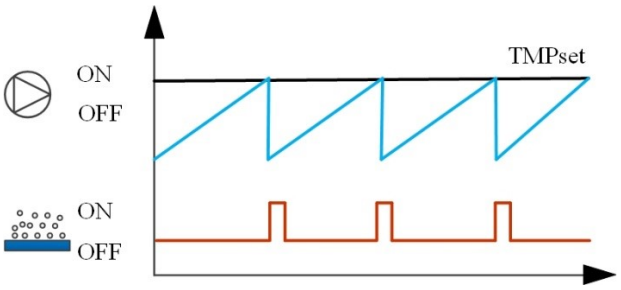


Figure S1 Pseudo dead-end filtration coupled with transmembrane pressure (TMP) set-point control mode.

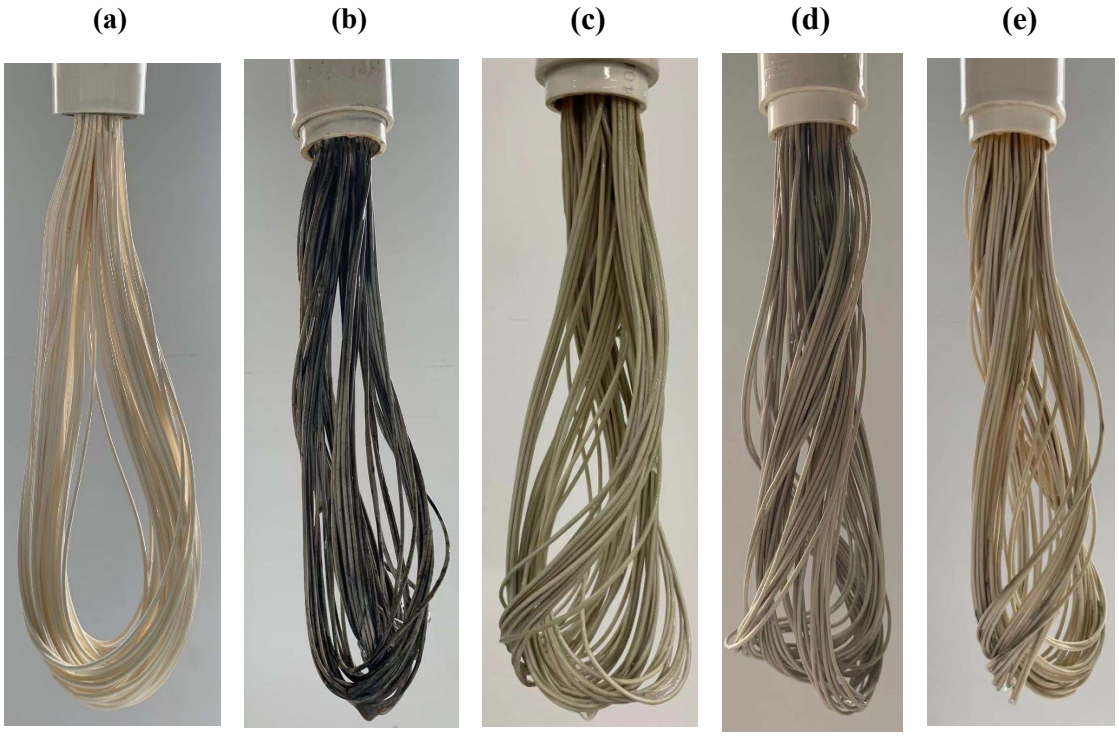
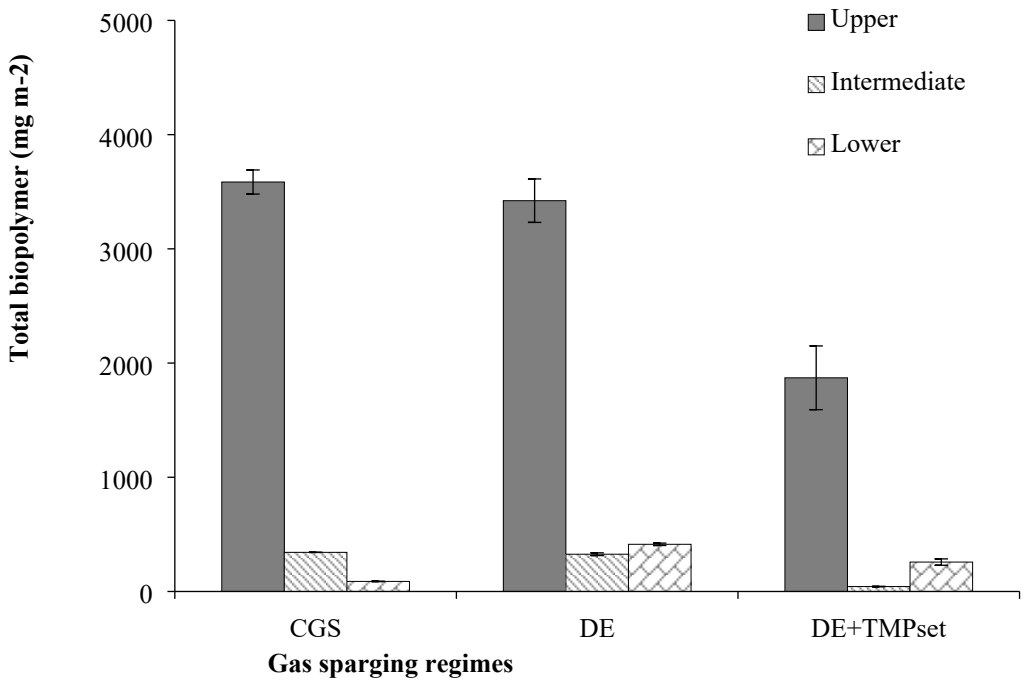


Figure S2 Images of (a) clean membrane, (b) membrane operated under continuous filtration without gas sparging, (c) CGS (continuous filtration + continuous gas sparging), (d) DE (pseudo dead-end filtration), (e) DE coupled with TMP_{set} (TMP_{set}=10 kPa). Detailed conditions can be referred to Table 2.



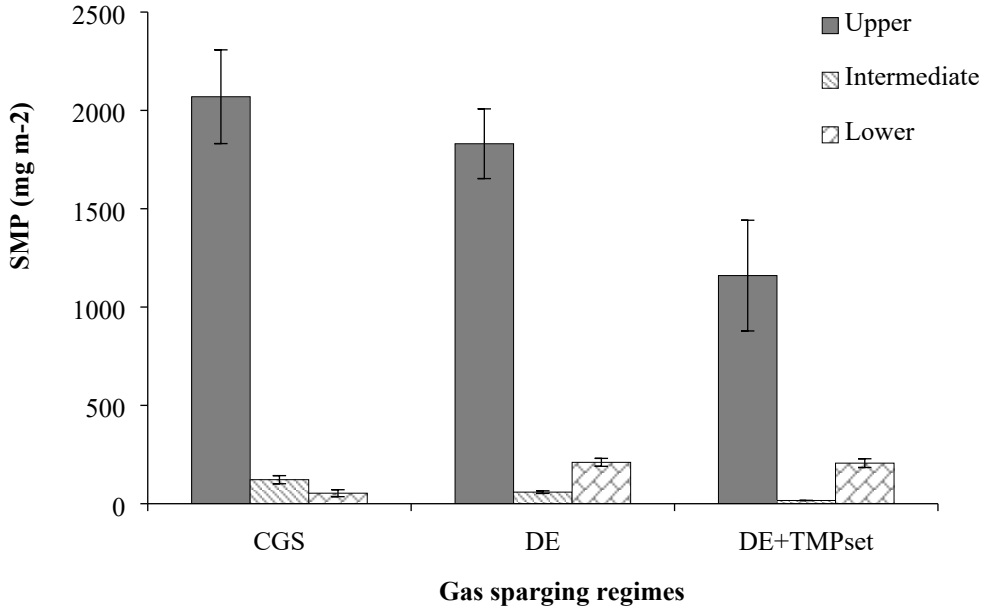


Figure S3 Total biopolymer (TBP), soluble microbial products (SMP) of the fouling cake after 72 h operation under different gas sparging regimes. CGS (continuous filtration + continuous gas sparging); DE (pseudo dead-end filtration), TMPset (TMP set-point, TMPset=10 kPa).

Table S1 Values of operational parameters used in cost assessment.

Parameter	Unit	Values	Notes (Ref.)
Flow	$m^3 d^{-1}$	20000	
Biogas sparging energy	kWh m^{-3}	0.0162	Calculated from this study
Permeate pump energy	kWh m^{-3}	0.0530	Calculated from this study
Backwash pump energy	kWh m^{-3}	0.0232	Calculated from this study
Electricity	US$ kWh^{-1}	0.10	[1]
Sludge treatment	US$ ton^{-1}	200	[1]
MLVSS	kg MVLSS kg^{-1} COD	0.0378	[1]
Citric acid 50%	US$ kg^{-1}	0.88[a]	[2,3]
NaClO 14%	US$ L^{-1}	0.2946[b]	[2,3]

1€≈1.16$

*a. 0.76€/kg*1.16=0.88$/kg*; *b. 0.254€/*$L^{-1}$**1.16=0.2946*$ L^{-1}

Reference:

[1] H. Lin, J. Chen, F. Wang, L. Ding and H. Hong, Feasibility evaluation of submerged anaerobic membrane bioreactor for municipal secondary wastewater treatment, *Desalination*, 2011, **280**, 120–126.

[2] B. Verrecht, T. Maere, I. Nopens, C. Brepols and S. Judd, The cost of a large-scale hollow fibre MBR, *Water Res.*, 2010, **44**, 5274–5283.

[3] Alibaba. Chemical product price enquiry. www.alibaba.com, 2021.