NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE
Advanced Environmental Biotechnology Centre
Nanyang Environment and Water Research Institute

# Generation of dissolved organic matter by ozonation and its potential on membrane fouling in ceramic MBR

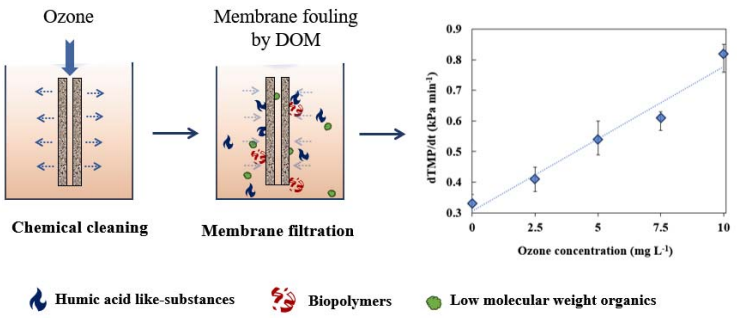
## Objective

To investigate the generation of DOM during on-line cleaning with ozone and subsequent impact on membrane fouling in ceramic MBR.

## Research members

LIU YU (Full Professor); SUN HUIFANG (Research Fellow)

## Graphic abstract




Ozone could trigger serious DOM release during on-line chemical cleaning in ceramic MBR. The released DOM could considerably induce irreversible membrane fouling, which may negatively impact on the long-term effectiveness of on-line chemical cleaning in ceramic MBR.

## Results

DOM concentration in the liquid phase was found to increase with rising ozone dosages from 0 to 10 mg/L. Membrane fouling rates of supernatants were positively correlated with the amount of DOM released, and pore blocking was the major cause of the observed membrane fouling. The LC-OCD-OND analysis revealed that humic acid like-substances (HAL) with MW of about 500 Da could be easily rejected by the 0.2-μm ceramic membranes used.

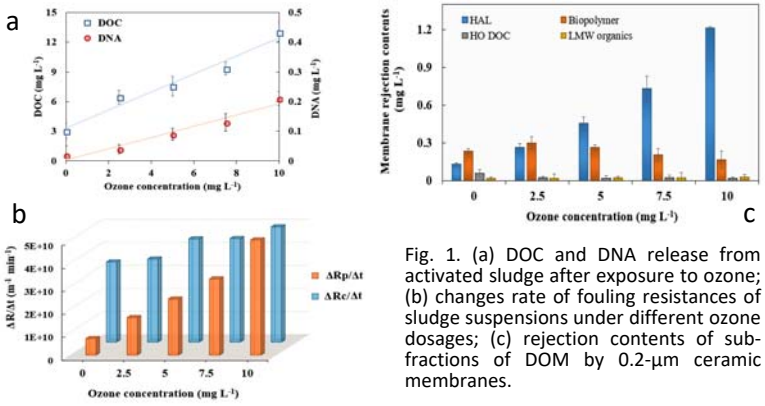



Fig. 1. (a) DOC and DNA release from activated sludge after exposure to ozone; (b) changes rate of fouling resistances of sludge suspensions under different ozone dosages; (c) rejection contents of sub-fractions of DOM by 0.2-μm ceramic membranes.

## Conclusions

It was demonstrated that DOM generation from activated sludge after exposure to ozone had a profound impact on irreversible membrane fouling. Consequently, the membrane fouling associated with DOM induced by ozone during on-line cleaning should not be ignored in the design and operation of ceramic MBR towards long-term process sustainability.