Section S1 High-throughput sequencing

The PCR amplification of 16S rRNA gene was performed as follows: initial denaturation at 95 ℃ for 3 min, followed by 27 cycles of denaturing at 95 ℃ for 30 s, annealing at 55 ℃ for 30 s and extension at 72 ℃ for 45 s, and single extension at 72 ℃ for 10 min, and end at 4 ℃. The PCR mixtures contain 5 × TransStart FastPfu buffer 4 μL, 2.5 mM dNTPs 2 μL , forward primer (5 μM) 0.8 μL, reverse primer (5 μM) 0.8 μL, TransStart FastPfu DNA Polymerase 0.4 μL, template DNA 10 ng, and finally ddH2O up to 20 μL.

Fig. S1 Attenuation trend of DO under different pH values of the influent

Fig. S2 Attenuation trend of DO under different temperatures of the influent

Fig. S3 Attenuation trend of DO under different nutritional levels of the influent

Fig. S4 Attenuation trend of DO under different concentrations of sodium hypochlorite (pre-oxidant)

Fig. S5 Decay trend of residual chlorine under different initial residual chlorine concentrations

Fig. S6 Bacterial distribution of 27 most abundant genera among three biofilm samples. The color intensity of scale indicates relative abundance of each genus

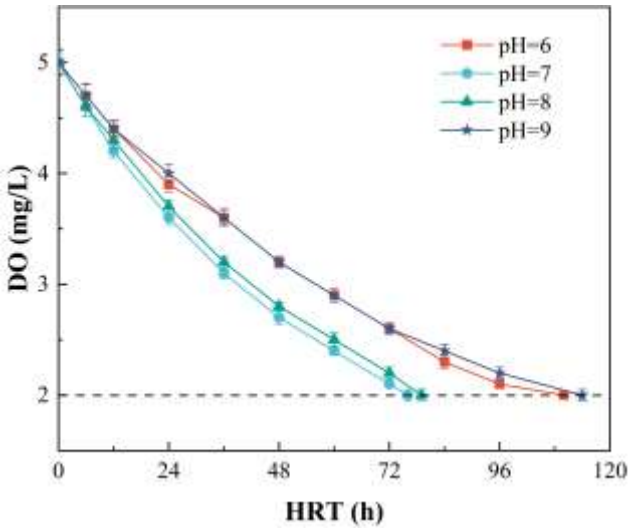


Fig. S1

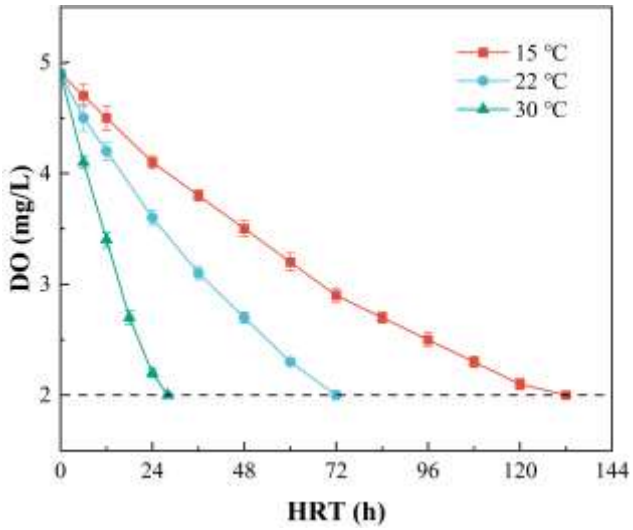
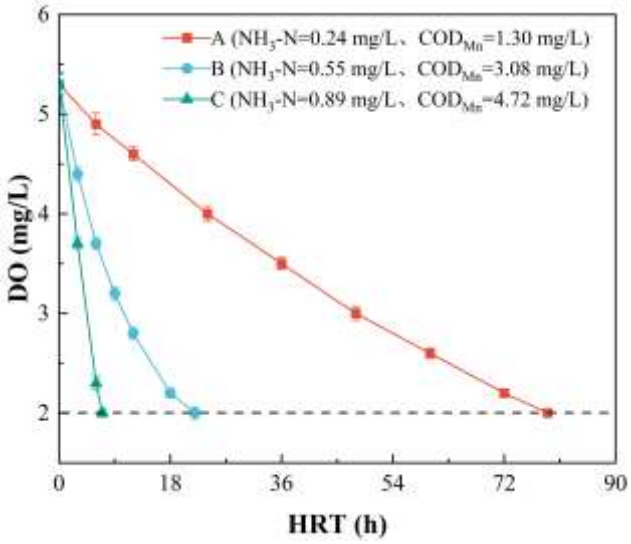


Fig. S2


A (NH_3-N=0.24 mg/L、COD_{Mn}=1.30 mg/L)
B (NH_3-N=0.55 mg/L、COD_{Mn}=3.08 mg/L)
C (NH_3-N=0.89 mg/L、COD_{Mn}=4.72 mg/L)
DO (mg/L)
HRT (h)
6
5
4
3
2
0
18
36
54
72
90
Fig. S3

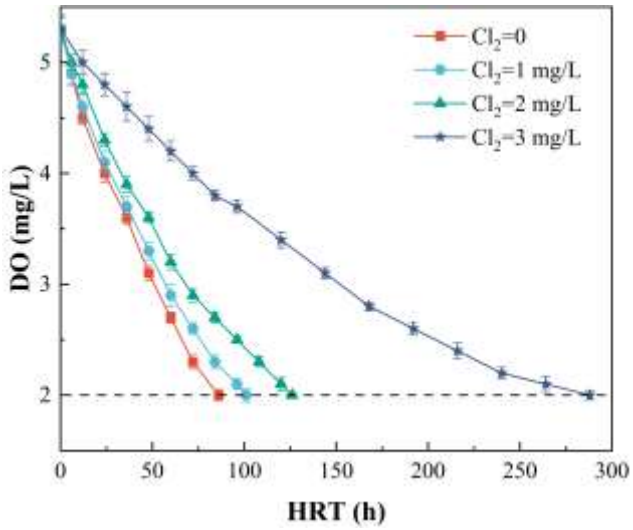

Cl2=0
Cl2=1 mg/L
Cl2=2 mg/L
Cl2=3 mg/L
DO (mg/L)
HRT (h)
5
4
3
2
0
50
100
150
200
250
300

Fig. S4

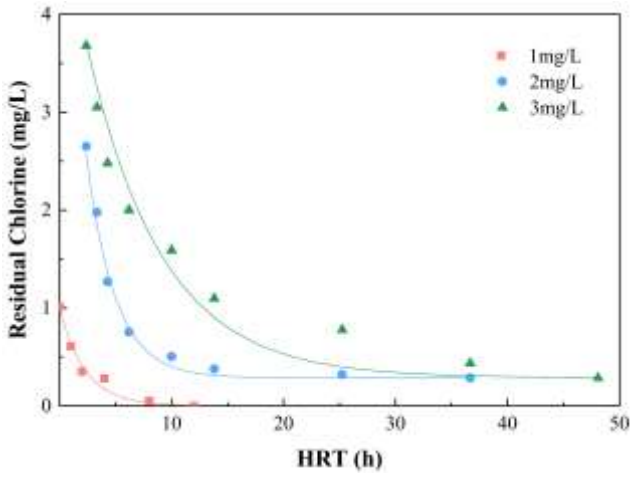

Residual Chlorine (mg/L)
HRT (h)
1mg/L
2mg/L
3mg/L
0
1
2
3
4
10
20
30
40
50

Fig. S5

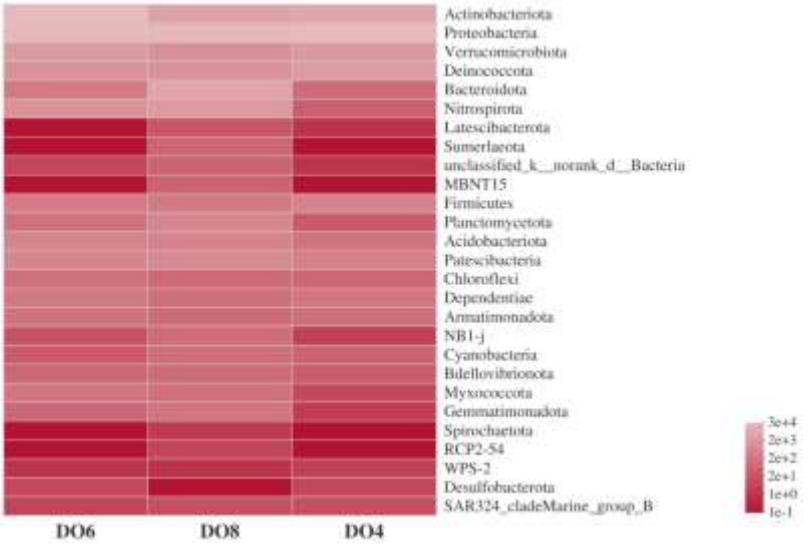

Actinobacteriota
Proteobacteria
Verrucomicrobiota
Deinococcota
Bacteroidota
Nitrospirota
Latescibacterota
Sumerlaeota
unclassified_k__norank_d__Bacteria
MBNT15
Firmicutes
Planctomycetota
Acidobacteriota
Patescibacteria
Chloroflexi
Dependentiae
Armatimonadota
NB1-j
Cyanobacteria
Bdellovibrionota
Myxococcota
Gemmatimonadota
Spirochaetota
RCP2-54
WPS-2
Desulfobacterota
SAR324_cladeMarine_group_B
3e+4
2e+3
2e+2
2e+1
1e+0
1e-1
DO6
DO8
DO4

Fig. S6

Table S1

Parameters of the raw water quality

Parameters (units)	Range
Temperature (℃)	14-25
pH value	6.72-7.17
DO (mg/L)	5.1-7.5
HPC (CFU/mL)	7-86
Turbidity (NTU)	0.86-4.15
Total alkalinity (mg/L)	15.4-23.4
Calcium hardness (mg/L)	4.2-21.0
Total manganese (mg/L)	0-0.45
NH_4^+ (mg/L)	0-0.34
NO_2^- (mg/L)	0-0.012
NO_3^- (mg/L)	0.603-1.272
COD_{Mn} (mg/L)	0.8-3.2

Table S2

Equation of decay of residual chlorine

Initial concentration of residual chlorine	Equation of decay of residual chlorine
1 mg/L	$y = e^{-0.43793t}$, $R^2 = 0.97543$
2 mg/L	$y = 2e^{-0.14255t}$, $R^2 = 0.95727$
3 mg/L	$y = 3e^{-0.37418t}$, $R^2 = 0.99111$