

Supplementary Materials

Particle Size Matters: Distribution, Source, and Seasonality Characteristics of Airborne and Pathogenic Bacteria in Wastewater Treatment Plants

Jianan Wan ¹, Zhiruo Zhang ², Yang Huo ^{1,3,*}, Xianze Wang ¹, Yifan Wang ¹, Jinghui Wu ^{1,2} and Mingxin Huo ¹

¹ Science and Technology Innovation Center for Municipal Wastewater Treatment and Water Quality Protection, Northeast Normal University, Changchun 130117, China; wanjn131@nenu.edu.cn (J.W.); wangxz940@nenu.edu.cn (X.W.); wangyf678@nenu.edu.cn (Y.W.); wujinghui@jlju.edu.cn (J.W.); huomx097@nenu.edu.cn (M.H.)

² Key Laboratory of Songliao Aquatic Environment, Ministry of Education, Jilin Jianzhu University, Changchun 130118, China; zhangzhiruo@jlju.edu.cn

³ Center for Advanced Optoelectronic Functional Materials Research, Key Laboratory of UV Light-Emitting Materials and Technology of Ministry of Education, Northeast Normal University, Changchun 130024, China

* Correspondence: huo0814@outlook.com or huoy362@nenu.edu.cn

Table S1. meteorological conditions.

Site	T (°C)	RH (%)	SR (W/m ³)	W (m/s)
D_AT1-8	26.51	41.88	687.62	0.77
D_SST1-8	26.5	40.79	654.31	0.83
D_SRD1-8	27.91	41.52	65.23	0.03
D_SR1-8	26.85	98.67	71.25	0.04
C_AT1-8	26.18	39.47	678.22	0.64
C_SST1-8	26.57	38.67	657.9	0.52
C_SRD1-8	25.71	42.64	2.45	0.02
C_SR1-8	26.54	83.68	122.6	0.05
D_AT_AUT	17.91	26.34	421.12	0.82
D_AT_WIN	0.21	43.81	378.23	1.22

D: Plant D, C: Plant C;

AT: aeration tank, SST: secondary settling tank, SDR: sludge dewatering room, SR: screen room;

AUT: autumn, WIN: winter;

1-8: represent eight particle-size stages.



Figure S1. The picture of cover and deodorization in plant D.

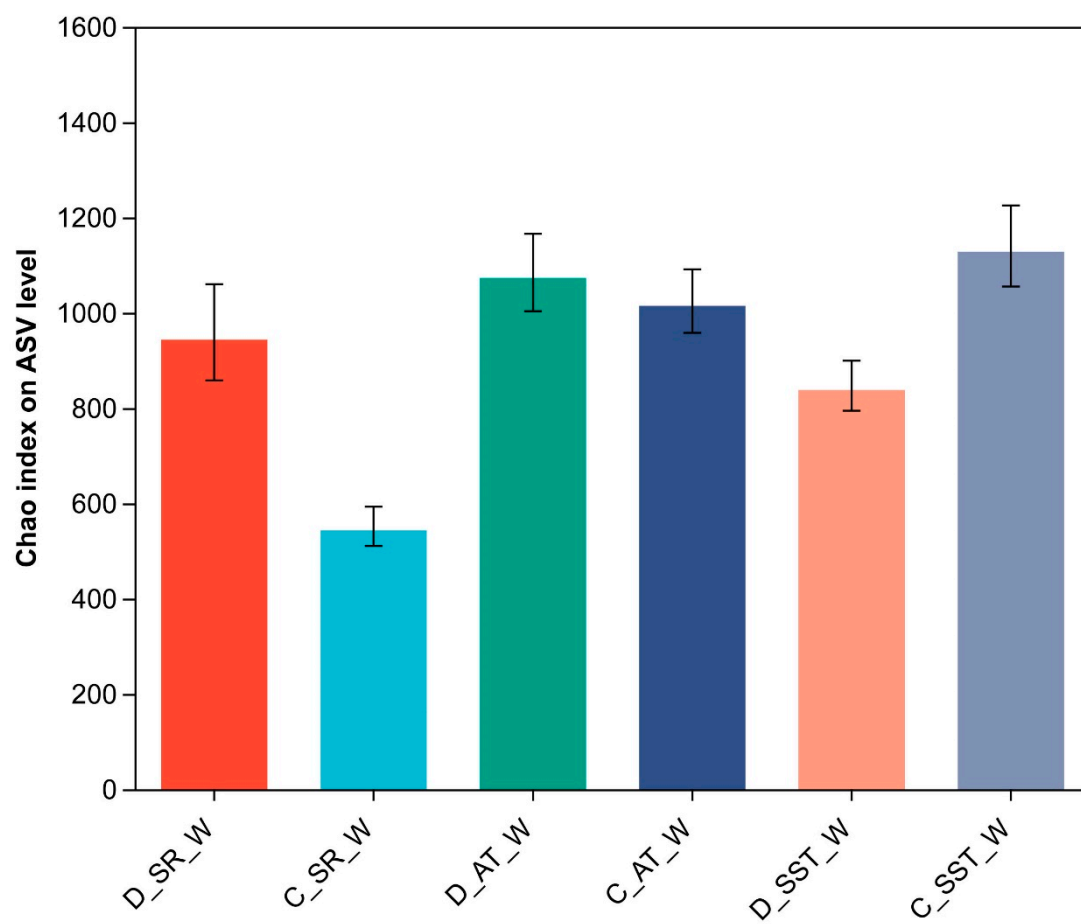


Figure S2. Chao of wastewater from the treatment unit of both plants.

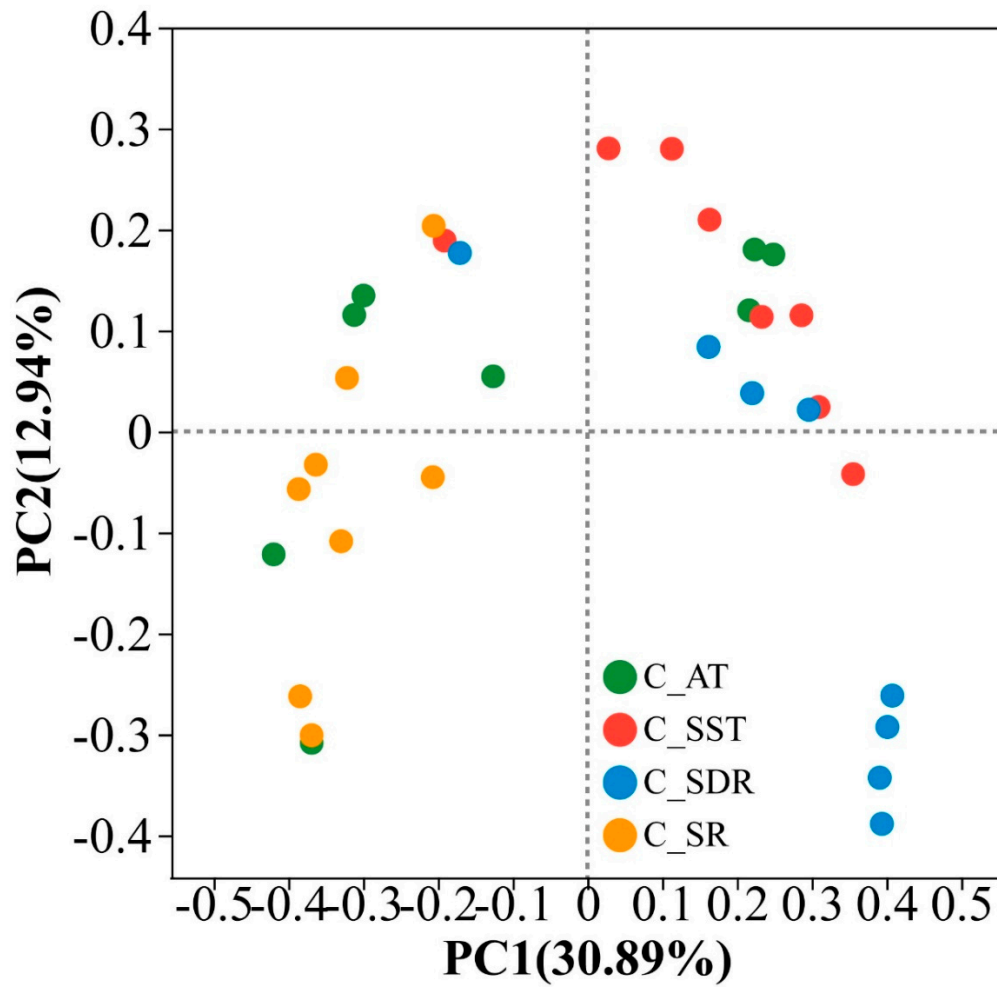


Figure S3. PCoA using unweighted UniFrac distances matrix to calculate Plant C samples. AT: aer-
ation tank, SST: secondary settling tank, SDR: sludge dewatering room, SR: screen room, and C:
Plant C.

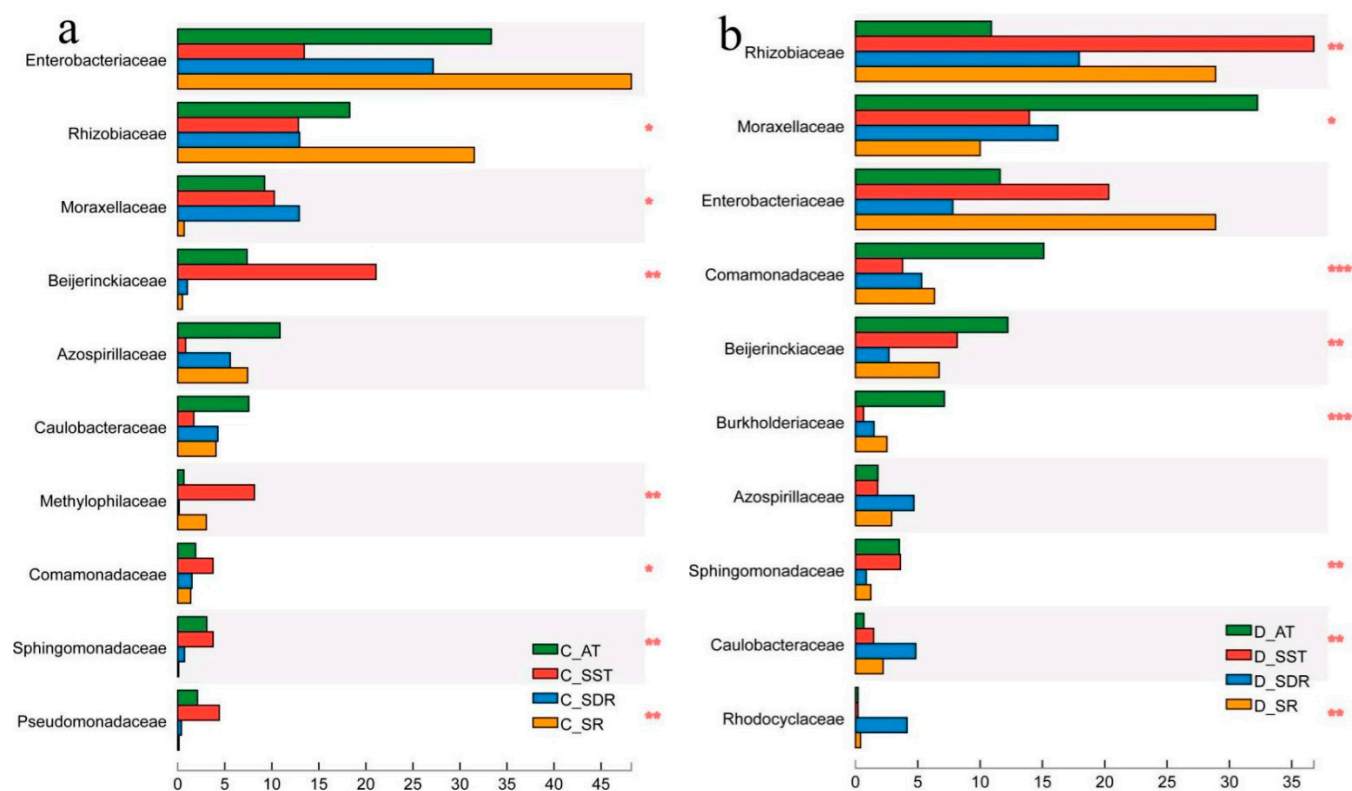


Figure S4. The difference in species composition at the top 15 family level of relative abundance among treatment units in Plant C (a) and Plant D (b). AT: aeration tank, SST: secondary settling tank, SDR: sludge dewatering room, SR: screen room. * Significant at 0.05 probability level, ** significant at 0.01 probability level, *** significant at 0.001 probability level.

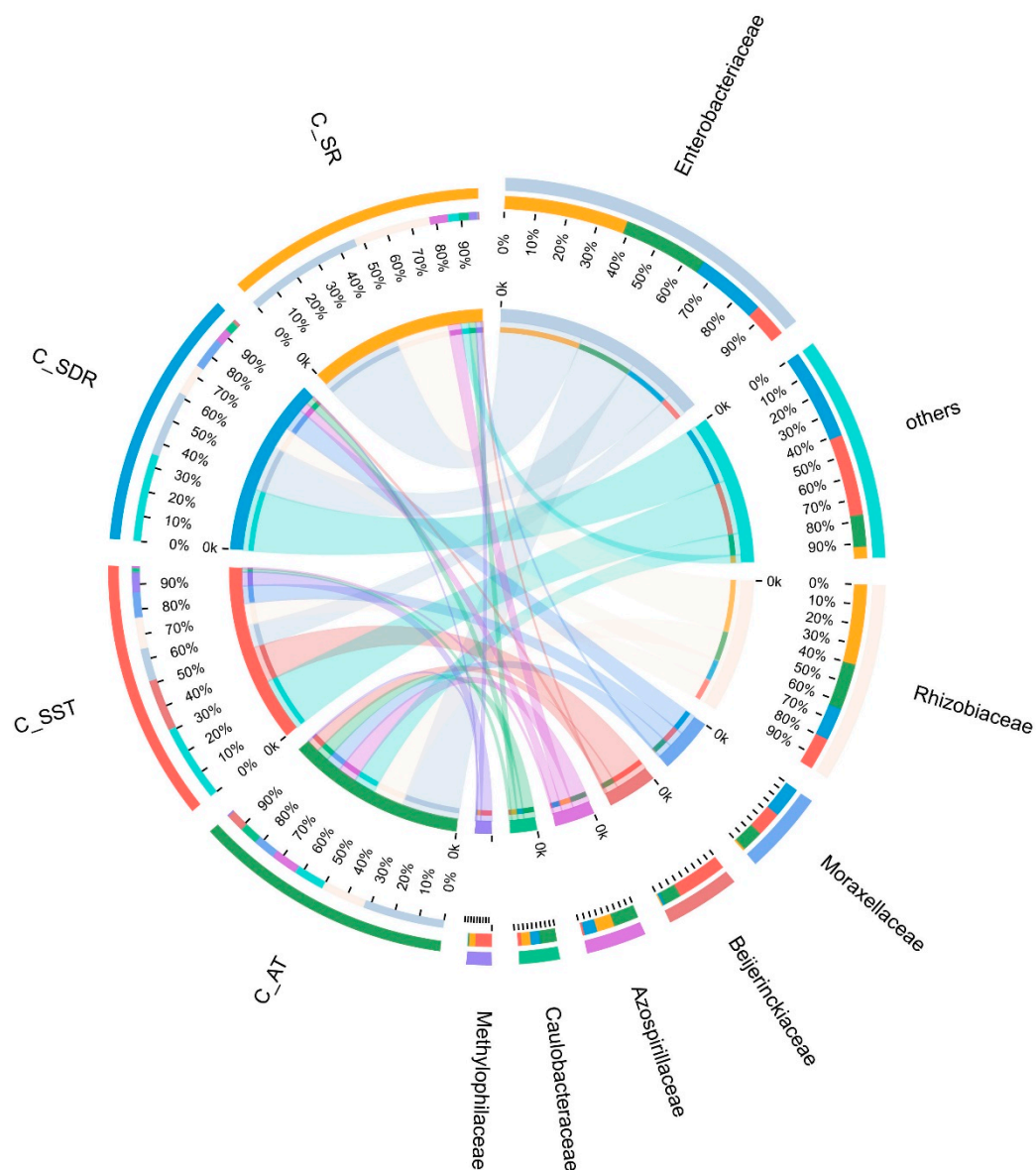


Figure S5. Circos plots exhibit the species composition of Plant C at the top 95% of family level of relative abundance in distinct treatment units. C_AT: aeration tank of Plant C, C_SST: secondary settling tank of C plant, C_SDR: sludge dewatering room of Plant C, and C_SR: screen room of Plant C.

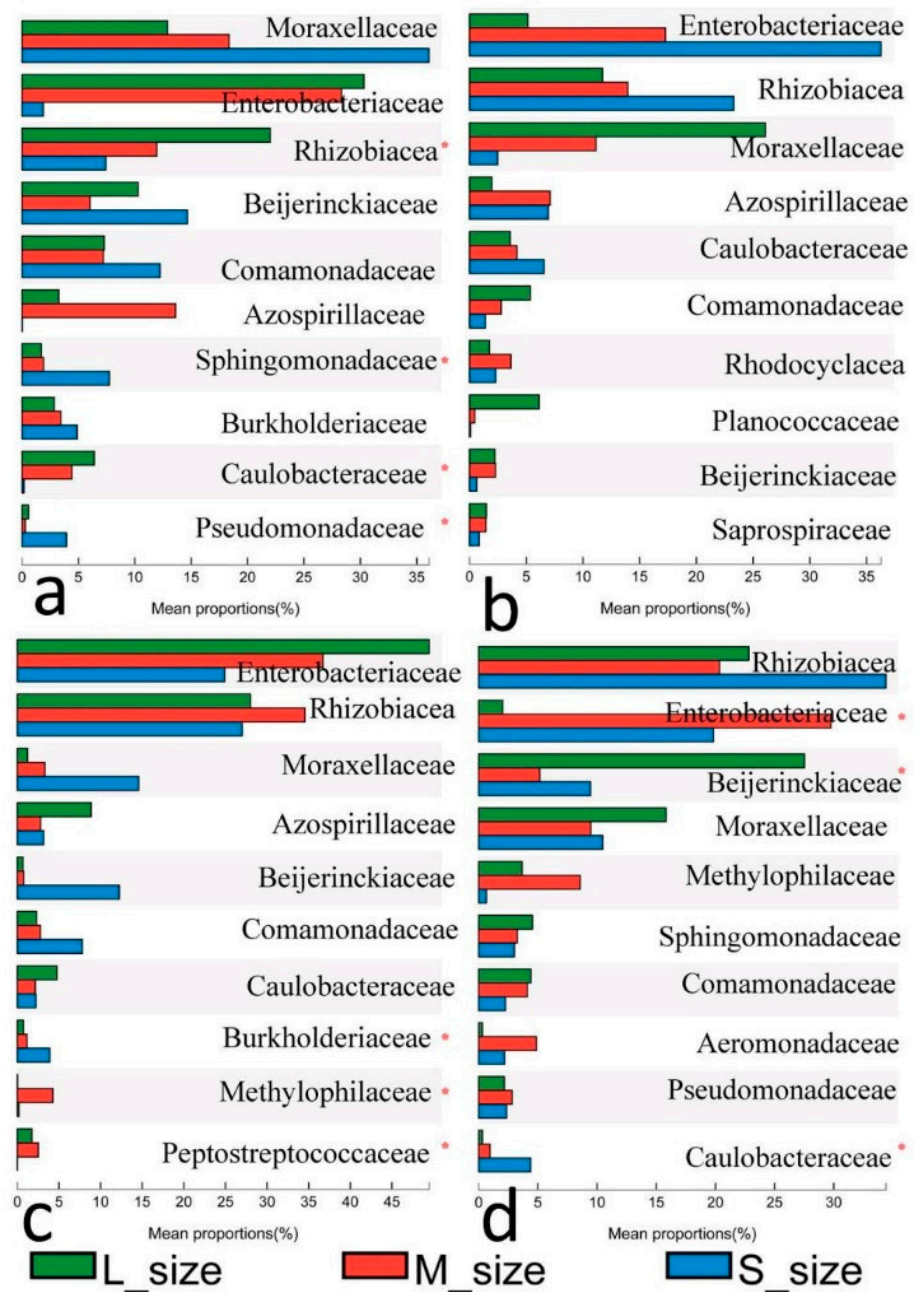


Figure S6. The difference in species composition at the top 15 family level of relative abundance among size distributions in AT (a), SDR (b), SR(c) and SST(d). L_size: large particles, M_size: medium particles, S_size: small particles.

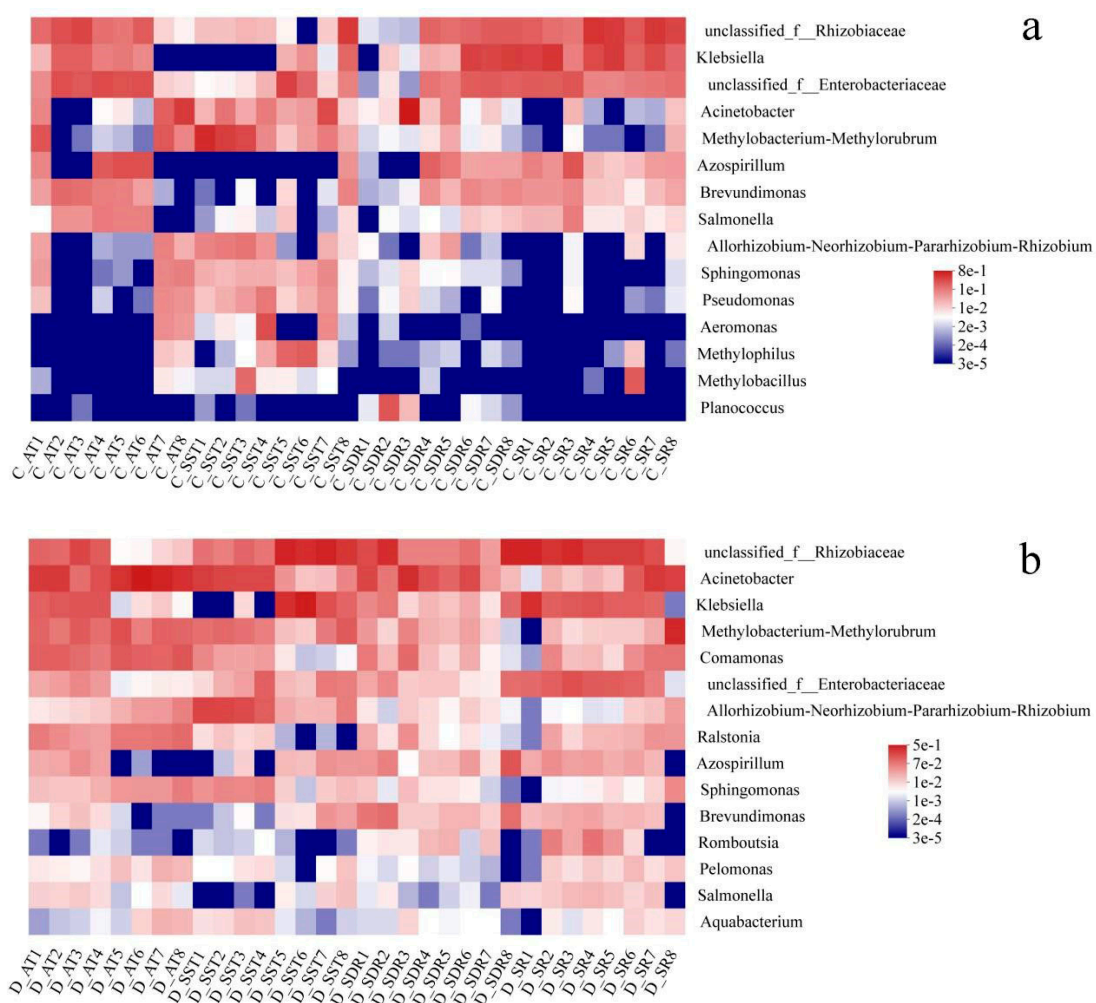


Figure S7. Heatmap of the main 15 bacterial genera in Plant C (a) and Plant D (b). The color gradient indicates the size of the proportion of species, 1-8: represent eight particle-size stages. AT: aeration tank, SST: secondary settling tank, SDR: sludge dewatering room, and SR: screen room, A: aerosol sample, and W: water sample.

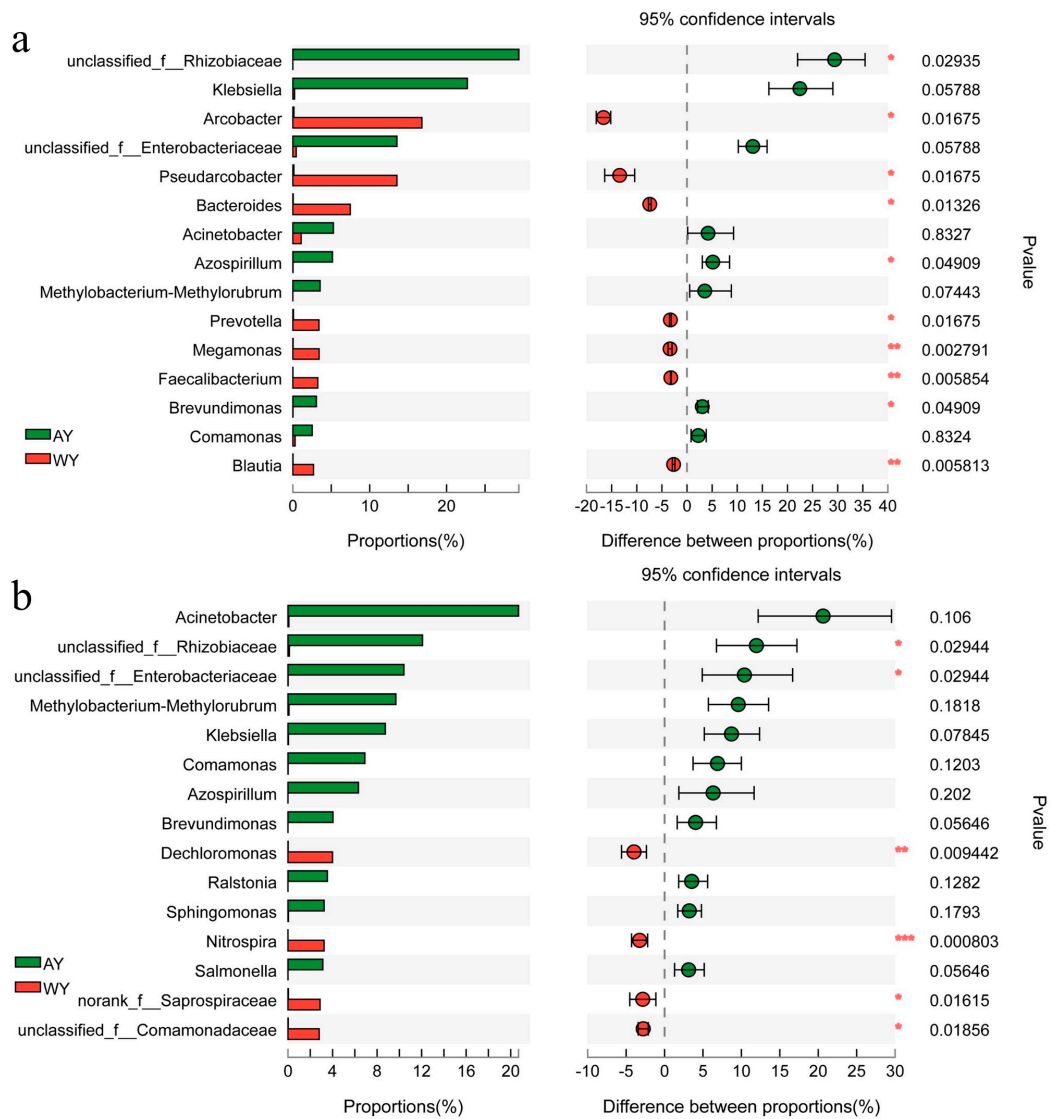


Figure S8. The difference in species composition at the top 15 genus level of relative abundance among wastewater (WY: red) and aerosols (AY: green) in SR (a) and AT (b).

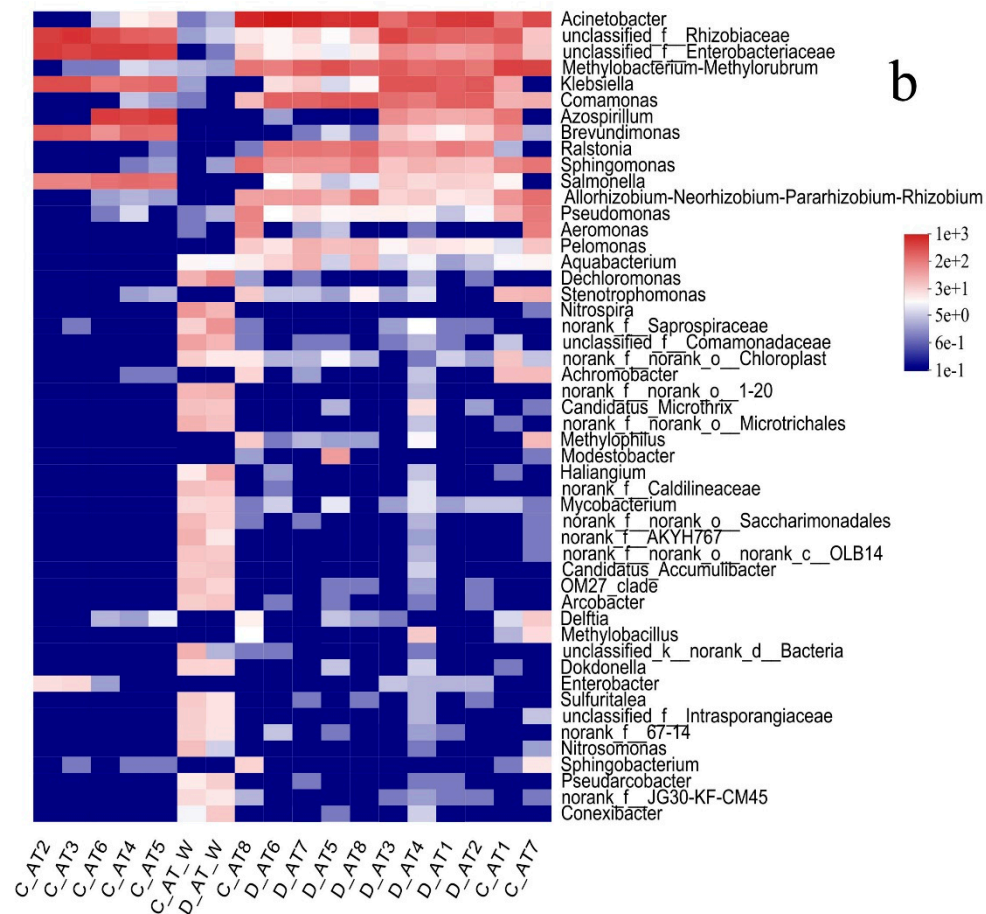
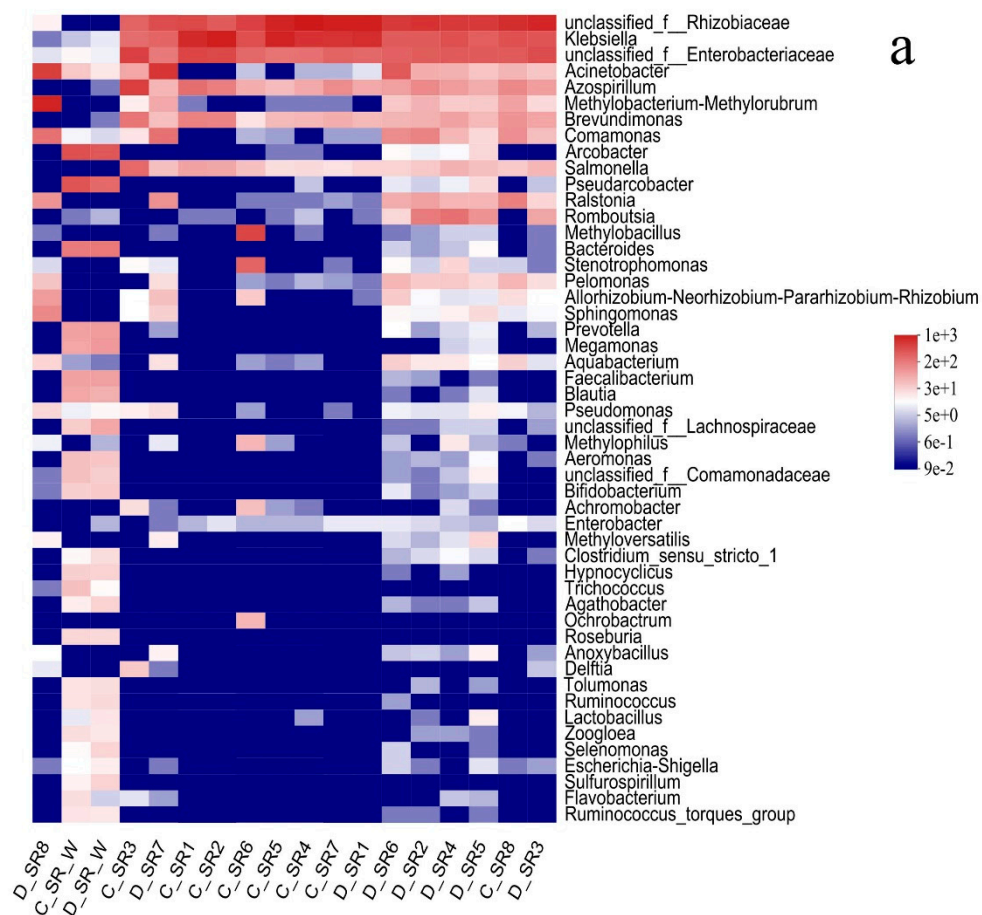


Figure S9. Heatmap of the main 50 bacterial genera in SR (a) and AT (b). The color gradient indicates the size of the proportion of species. 1-8: represent eight size stages. C_AT: aeration tank of Plant C, D_AT: aeration tank of Plant D, C_SR: screen room of Plant C, D_SR: screen room of Plant D, A: aerosol sample, and W: water sample.