Supplementary Materials

A practical protocol for experimental design of comparative studies on wastewater treatment

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1. Supplementary Material A: Schematic drawing of the two systems at lab scale

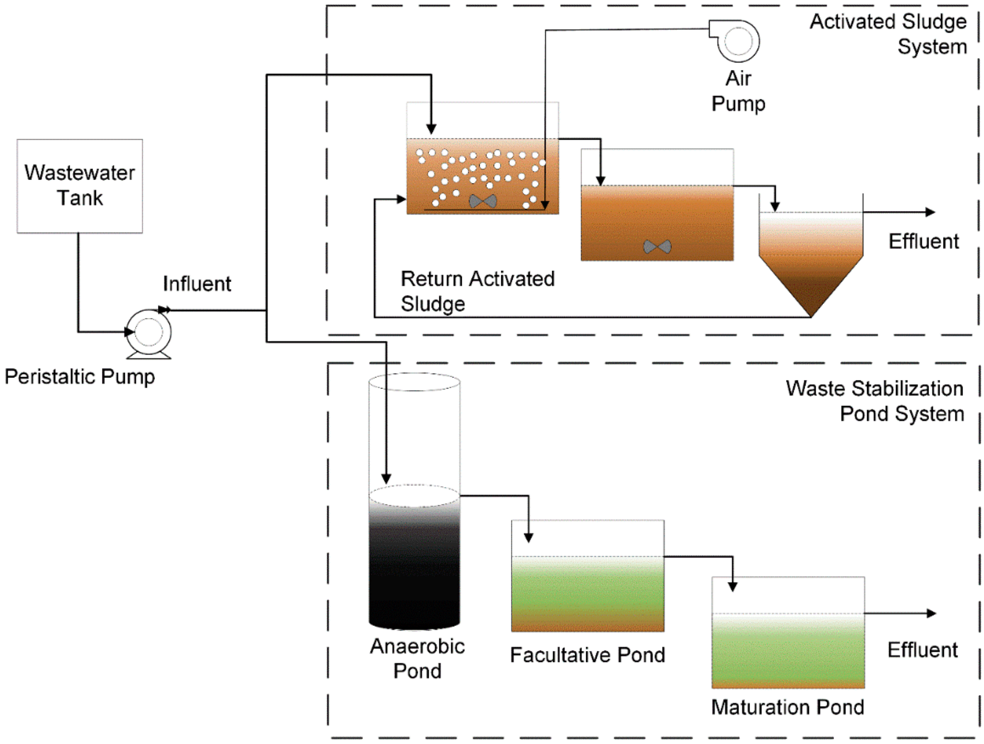

Figure A1. Schematic drawing of the two systems at lab scale. Two systems were installed in triplicate, which were located in one common room. The AS system was based on the Wuhrmann process and the conventional configuration of WSPs consisted of three compartments in series, including an anaerobic, a facultative and a maturation pond [1].

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2. Supplementary Material B: Predicted effluent concentrations of activated sludge and waste stabilization pond systems during the peak scenario

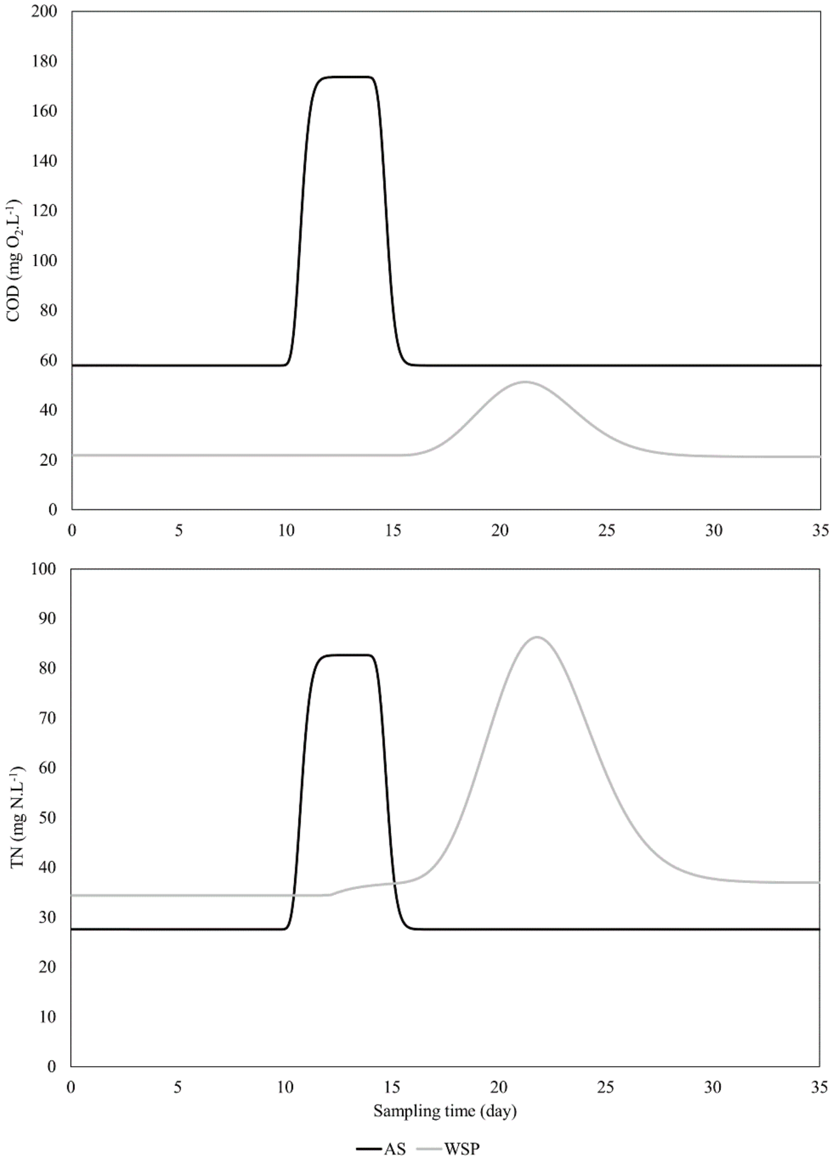

Figure B1. Predicted effluent concentrations (A: COD, B: TN) of conventional activated sludge and waste stabilisation pond systems during the peak scenario.

3. Supplementary Material C: Results of power analysis tests.

Table C1. Results of power analysis tests.

Number of test	nstart	nend	ntime	nrep	effect size	power
1	3	4	11	3	1	0.317
2	3	4	11	3	2	0.769
3	3	4	11	3	3	0.976
4	3	4	11	3	4	0.998
5	3	4	11	3	5	1
6	3	4	11	3	6	1
7	3	4	12	3	1	0.349
8	3	4	12	3	2	0.795
9	3	4	12	3	3	0.967
10	3	4	12	3	4	0.999
11	3	4	12	3	5	1
12	3	4	12	3	6	1
13	3	4	13	3	1	0.356
14	3	4	13	3	2	0.796
15	3	4	13	3	3	0.974
16	3	4	13	3	4	0.999
17	3	4	13	3	5	1
18	3	4	13	3	6	1
19	3	4	14	3	1	0.351
20	3	4	14	3	2	0.818
21	3	4	14	3	3	0.978
22	3	4	14	3	4	0.999
23	3	4	14	3	5	1
24	3	4	14	3	6	1
25	3	4	15	3	1	0.354
26	3	4	15	3	2	0.814
27	3	4	15	3	3	0.974
28	3	4	15	3	4	1
29	3	4	15	3	5	1
30	3	4	15	3	6	1
31	3	4	16	3	1	0.365
32	3	4	16	3	2	0.827
33	3	4	16	3	3	0.978
34	3	4	16	3	4	0.997
35	3	4	16	3	5	1
36	3	4	16	3	6	1
37	3	4	17	3	1	0.399
38	3	4	17	3	2	0.833
39	3	4	17	3	3	0.992
40	3	4	17	3	4	1
41	3	4	17	3	5	1
42	3	4	17	3	6	1

43	3	5	11	3	1	0.335
44	3	5	11	3	2	0.769
45	3	5	11	3	3	0.974
46	3	5	11	3	4	0.999
47	3	5	11	3	5	1
48	3	5	11	3	6	1
49	3	5	12	3	1	0.336
50	3	5	12	3	2	0.787
51	3	5	12	3	3	0.971
52	3	5	12	3	4	1
53	3	5	12	3	5	1
54	3	5	12	3	6	1
55	3	5	13	3	1	0.37
56	3	5	13	3	2	0.782
57	3	5	13	3	3	0.973
58	3	5	13	3	4	0.999
59	3	5	13	3	5	1
60	3	5	13	3	6	1
61	3	5	14	3	1	0.35
62	3	5	14	3	2	0.811
63	3	5	14	3	3	0.988
64	3	5	14	3	4	0.999
65	3	5	14	3	5	1
66	3	5	14	3	6	1
67	3	5	15	3	1	0.375
68	3	5	15	3	2	0.818
69	3	5	15	3	3	0.984
70	3	5	15	3	4	1
71	3	5	15	3	5	1
72	3	5	15	3	6	1
73	3	5	16	3	1	0.371
74	3	5	16	3	2	0.826
75	3	5	16	3	3	0.986
76	3	5	16	3	4	1
77	3	5	16	3	5	1
78	3	5	16	3	6	1
79	3	5	17	3	1	0.397
80	3	5	17	3	2	0.838
81	3	5	17	3	3	0.985
82	3	5	17	3	4	0.999
83	3	5	17	3	5	1
84	3	5	17	3	6	1
85	4	4	11	3	1	0.347
86	4	4	11	3	2	0.778
87	4	4	11	3	3	0.969
88	4	4	11	3	4	0.996

89	4	4	11	3	5	1
90	4	4	11	3	6	1
91	4	4	12	3	1	0.356
92	4	4	12	3	2	0.783
93	4	4	12	3	3	0.964
94	4	4	12	3	4	0.998
95	4	4	12	3	5	1
96	4	4	12	3	6	1
97	4	4	13	3	1	0.359
98	4	4	13	3	2	0.804
99	4	4	13	3	3	0.964
100	4	4	13	3	4	1
101	4	4	13	3	5	1
102	4	4	13	3	6	1
103	4	4	14	3	1	0.365
104	4	4	14	3	2	0.825
105	4	4	14	3	3	0.981
106	4	4	14	3	4	0.999
107	4	4	14	3	5	1
108	4	4	14	3	6	1
109	4	4	15	3	1	0.379
110	4	4	15	3	2	0.807
111	4	4	15	3	3	0.989
112	4	4	15	3	4	1
113	4	4	15	3	5	1
114	4	4	15	3	6	1
115	4	4	16	3	1	0.393
116	4	4	16	3	2	0.831
117	4	4	16	3	3	0.979
118	4	4	16	3	4	1
119	4	4	16	3	5	1
120	4	4	16	3	6	1
121	4	4	17	3	1	0.4
122	4	4	17	3	2	0.843
123	4	4	17	3	3	0.981
124	4	4	17	3	4	1
125	4	4	17	3	5	1
126	4	4	17	3	6	1
127	4	5	11	3	1	0.34
128	4	5	11	3	2	0.765
129	4	5	11	3	3	0.97
130	4	5	11	3	4	0.999
131	4	5	11	3	5	1
132	4	5	11	3	6	1
133	4	5	12	3	1	0.352
134	4	5	12	3	2	0.788

135	4	5	12	3	3	0.975
136	4	5	12	3	4	0.999
137	4	5	12	3	5	1
138	4	5	12	3	6	1
139	4	5	13	3	1	0.355
140	4	5	13	3	2	0.79
141	4	5	13	3	3	0.985
142	4	5	13	3	4	0.996
143	4	5	13	3	5	1
144	4	5	13	3	6	1
145	4	5	14	3	1	0.384
146	4	5	14	3	2	0.815
147	4	5	14	3	3	0.979
148	4	5	14	3	4	0.999
149	4	5	14	3	5	1
150	4	5	14	3	6	1
151	4	5	15	3	1	0.382
152	4	5	15	3	2	0.836
153	4	5	15	3	3	0.984
154	4	5	15	3	4	1
155	4	5	15	3	5	1
156	4	5	15	3	6	1
157	4	5	16	3	1	0.376
158	4	5	16	3	2	0.839
159	4	5	16	3	3	0.978
160	4	5	16	3	4	0.999
161	4	5	16	3	5	1
162	4	5	16	3	6	1
163	4	5	17	3	1	0.374
164	4	5	17	3	2	0.815
165	4	5	17	3	3	0.99
166	4	5	17	3	4	1
167	4	5	17	3	5	1
168	4	5	17	3	6	1

nstart: number of the sample at the starting phase (from 3 to 4).

nend: number of the sample at the end phase (from 4 to 5).

ntime: total number of the sample during the scenario (from 11 to 17)

nrep: number of replicates per system (3)

Effect size: the effect size or the relevant difference was estimated, based on the data in the preliminary study (from 1 to 6 mg × L^{-1})

References

1. Ho, L.; Van Echelpoel, W.; Charalambous, P.; Gordillo, A.; Thas, O.; Goethals, P. Statistically-based comparison of the removal efficiencies and resilience capacities between conventional and natural wastewater treatment systems: A peak load scenario. *Water-Sui* **2018**, *10*, 328.