Supplementary Information

Role and Effectiveness of Monoculture and Polyculture Phytoremediation System in Fish Farm Wastewater

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Table S1 Quality of fish farm wastewater

Parameter	Average value	Range
Ammonia, NH$_3$-N (mg/L)	22.61 ± 0.95	16.80 - 28.10
Nitrate, NO$_3^-$-N (mg/L)	<0.3	<0.3
Nitrite, NO$_2^-$-N (mg/L)	<0.01	<0.01
Phosphate, PO$_4^{3-}$ (mg/L)	3.26 ± 0.40	1.98 - 5.80
TSS (mg/L)	126 ± 10	75 - 175
Turbidity (NTU)	151.15 ± 17.41	71.90 - 269.00
COD (mg/L)	185 ± 19	120 - 322
pH	7.58 ± 0.06	7.32 - 7.80

Table S2 Statistical analysis on the pollutant level of (a) ammonia (NH_3-N), (b) nitrate (NO_3^--N), (c) nitrite (NO_2^--N), (d) phosphate (PO_4^{3-}), (e) total suspended solids (TSS), (f) turbidity and (g) COD in wastewater treated by *Spirodela polyrhiza* monoculture system, *Lemna* sp. monoculture system, *Spirodela polyrhiza* + *Lemna* sp. polyculture system and control system for 14 days. Statistical significance was evaluated based on one-way analysis of variance (ANOVA) followed by Fisher LSD all-pairwise comparison test at $p < 0.05$. The systems that do not share a letter are significantly different in their treated pollutant levels.

(a)

Type of Treatment System	Day 2	Day 4	Day 6	Day 8	Day 10	Day 12	Day 14
Control	A	A	A	A	A	A	A
Spirodela	C	B	B	A	A	A	A
Lemna	AB	A	A	A	A	A	A
S. polyrhiza + *Lemna* sp.	BC	A	A	A	A	A	A

(b)

Type of Treatment System	Day 2	Day 4	Day 6	Day 8	Day 10	Day 12	Day 14
Control	A	B	AB	B	A	B	A
Spirodela	A	AB	B	C	B	C	B
Lemna	A	AB	AB	A	AB	A	A
S. polyrhiza + *Lemna* sp.	A	A	A	A	A	BC	A

(c)

Type of Treatment System	Day 2	Day 4	Day 6	Day 8	Day 10	Day 12	Day 14
Control	A	B	AB	AB	A	B	A
Spirodela	A	B	C	B	B	AB	A
Lemna	A	B	B	A	AB	A	A
S. polyrhiza + *Lemna* sp.	A	A	A	AB	AB	B	A

(d)

Type of Treatment System	Day 2	Day 4	Day 6	Day 8	Day 10	Day 12	Day 14
Control	A	A	A	A	A	A	A
Spirodela	B	B	A	B	C	B	B
Lemna	AB	A	A	AB	AB	B	B
S. polyrhiza + *Lemna* sp.	B	AB	A	AB	BC	B	B

(e)

Type of Treatment System	Day 2	Day 4	Day 6	Day 8	Day 10	Day 12	Day 14
Control	A	A	A	A	A	A	A
Spirodela	AB	B	B	C	B	B	B
Lemna	B	B	B	BC	B	B	B
S. polyrhiza + *Lemna* sp.	B	B	AB	B	B	B	B

(f)

Type of Treatment System	Day 2	Day 4	Day 6	Day 8	Day 10	Day 12	Day 14
Control	A	A	A	A	A	A	A
Spirodela	A	A	A	B	A	A	A
Lemna	A	A	A	B	A	A	A
S. polyrhiza + *Lemna* sp.	A	A	A	B	A	A	A

(g)

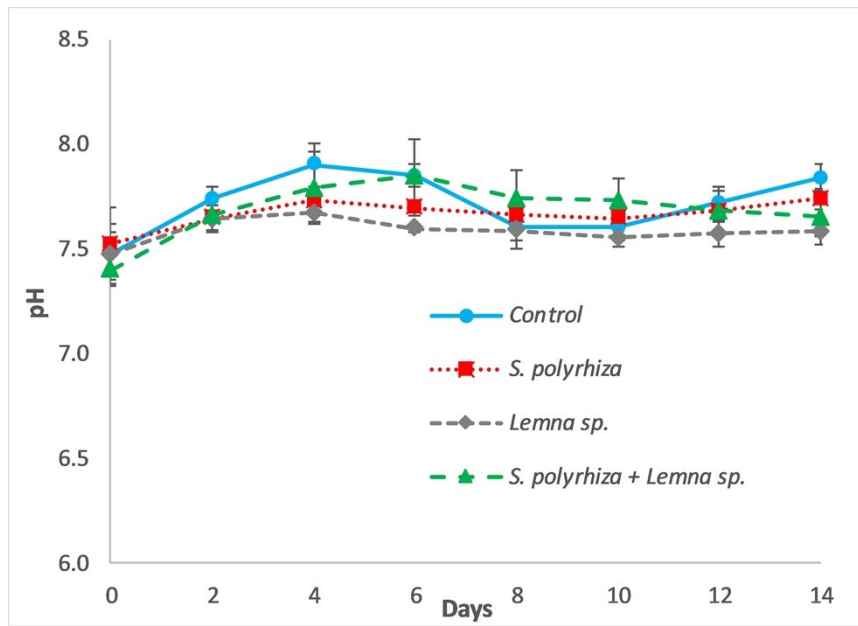| Type of Treatment System	Day 2	Day 4	Day 6	Day 8	Day 10	Day 12	Day 14
Control	A	A	A	A	A	A	A
Spirodela	A	A	A	A	A	A	A
Lemna	A	A	A	A	A	A	A
S. polyrhiza + *Lemna* sp.	A	A	A	A	A	A	A

Fig. S1 pH value of the fish farm wastewater in the *S. polyrhiza* monoculture system, *Lemna* sp. monoculture system and *S. polyrhiza* + *Lemna* sp. polyculture system during 14 days of experiment