



**Figure S1.** Parameters of the nutrient solutions in boxes of lettuce unexposed (A, B) and exposed (C, D) to pathogen *Pythium* sp., one day after microbial inoculates addition (day 26) and one day before harvest (day 60).

**Abbreviations:** HP: nutrient solution from inorganic nutrient source; AE: nutrient solution from aquaculture effluent from an aquaculture farm; T1: addition of RhizoVital42<sup>®</sup> (Andermatt Biocontrol AG, Switzerland); T2: addition of sludge from the aquaculture farm; T3: sludge from a wastewater treatment plant (Abwasserreinigungsanlagen, Au, Switzerland); T4: activated effective microorganism BodenFIT<sup>®</sup> (EM Schweiz AG, Switzerland).

**Table S1.** Technical details of the pikeperch (*Sander lucioperca*) aquaculture farm whose effluent water was used as nutrient solution containing organic nutrient sources and functioning as a proxy for decoupled aquaponics.

Farm type	Farmed species	Fish size (g)	Mean density (kg/m <sup>3</sup> )	Total rearing volume (m <sup>3</sup> )	Total fish biomass (kg)
RAS	<i>Sander lucioperca</i>	300-1000	37	75	2000

**Table S2.** Actions carried out during lettuce culture.

Day	Action
1	Seeding of seeds in the rockwool cubes in trays
12	Seedlings with rockwool transplanted into floating rafts
12 to 25	Increasing nutrient concentration in boxes to reach target values
25	Target values of nutrient concentration reached and addition of microbial <i>inocula</i>
26	Water sampling and change #1
27	Photosynthetic photon flux density set to 250 for growing plants
30	Challenge test: Addition of the pathogen <i>Pythium</i> grown on millet
32	Fe EDTA addition in AE boxes to reach the same amount as in HP boxes
32	Water sampling and exchange #2
39	Water sampling and exchange #3
46	Water sampling and exchange #4
53	Water sampling and exchange #5
60	Dualex measurements, water sampling
61	Harvest and sampling for measurements of biomass composition

**Table S3.** Average element concentrations in the shoots of unexposed lettuces at harvest (Day 61); values are means for each treatment, irrespective of the system; the p-values were calculated with a type 2 ANOVA following the reduced model disregarding the interaction between the two factors.

Treatment	C	T1	T2	T3	T4	ANOVA
Root/shoot ratio	0.22 <sup>ab</sup>	0.26 <sup>a</sup>	0.21 <sup>b</sup>	0.25 <sup>ab</sup>	0.22 <sup>ab</sup>	<i>T</i> : *
Mg, mg/g	4.14 <sup>ab</sup>	3.47 <sup>b</sup>	4.27 <sup>a</sup>	4.14 <sup>ab</sup>	3.38 <sup>b</sup>	<i>T</i> : **
S, mg/g	2.54 <sup>a</sup>	2.10 <sup>b</sup>	2.52 <sup>a</sup>	2.39 <sup>ab</sup>	2.17 <sup>ab</sup>	<i>T</i> : *
Zn, µg/g	43.1 <sup>ab</sup>	36.9 <sup>b</sup>	43.8 <sup>ab</sup>	48.9 <sup>a</sup>	35.6 <sup>b</sup>	<i>T</i> : ***

*Different superscripts indicate significant differences for the treatment factor.*

\*:  $p < 0.05$ ; \*\*:  $p < 0.01$ ; \*\*\*:  $p < 0.001$ .

**Table S4.** Average copper concentrations in the shoots of lettuces exposed to the pathogen *Pythium* sp. at harvest (Day 61); values are means for each treatment, irrespective of the system; the p-values were calculated with a type 2 ANOVA following the reduced model disregarding the interaction between the two factors.

Treatment	C	T1	T2	T3	T4	ANOVA
Cu	8.37 <sup>b</sup>	8.93 <sup>ab</sup>	8.97 <sup>ab</sup>	10.68 <sup>a</sup>	8.45 <sup>b</sup>	<i>T</i> : *

*Different superscripts indicate significant differences for the treatment factor.*

\*:  $p < 0.05$ .