

Article Supplementary Materials

Upcycling phosphorus recovered from anaerobically digested dairy manure to support production of vegetables and flowers

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Table S1. Nutrient contents of as-is and dried fine solids, other blend ingredients, derived plant foods, and the market alternative on a dry weight basis.

	As-is Fine Solids	Dried Fine Solids ^a	Potting Mix	Dried Distiller's Grain & Whey Permeate	Biochar	Plant Food A	Plant Food A1	Plant Food A2	Plant Food B	Market Altern- ative
Total N (g kg ⁻¹)	50.2 ^c	19.5 ^c	5.7 ^b	39.8 ^b	17.8 ^b	41.6 ^c	41.6 ^c	40.4 ^c	40.1 ^c	44.9 ^b
Organic N (g kg ⁻¹)	38.8 ^e	17.7 ^e	5.7 ^d	39.7 ^d	17.5 ^d	40.1 ^e	40.5 ^e	39.7 ^e	38.8 ^e	NA
NH ₄ -N (g kg ⁻¹)	11.3	1.8	0.0	0.1	0.3	1.5	1.1	0.7	1.3	NA
NO ₃ -N (g kg ⁻¹)	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA
Total P (g kg ⁻¹)	18.3	17.1	0.6	5.3	8.3	16.0	17.1	17.4	16.1	19.3
Neutral NH ₄ Citrate P (g kg ⁻¹)	19.4	19.5	0.4	5.3	6.8	17.3	16.5	16.0	16.9	15.7
2% Citric Acid P (g kg ⁻¹)	15.3	11.9	NA	NA	NA	11.8	10.8	9.7	11.8	9.9
Olsen P (g kg ⁻¹)	0.8	1.8	NA	NA	NA	1.9	1.9	2.1	1.6	0.7
Water Extractable P (g kg ⁻¹)	1.9	3.0	NA	NA	NA	3.2	3.4	3.4	3.5	2.3
Total K (g kg ⁻¹)	14.7	12.9	1.2	7.6	31.0	13.3	14.5	14.9	13.8	19.4
Neutral NH ₄ Citrate K (g kg ⁻¹)	18.6	16.9	1.5	8.4	32.5	16.9	16.2	15.8	16.1	21.4
Total C (g kg ⁻¹)	405	383	329	470	550	386	413	424	388	NA
Total B (g kg ⁻¹)	0.02	0.02	0.03	0.00	0.04	0.02	0.02	0.02	0.02	0.00
Total Ca (g kg ⁻¹)	32	32	25	2	35	22	22	22	22	56
Total Cu (g kg ⁻¹)	0.64	0.66	0.04	0.00	0.03	0.67	0.70	0.69	0.68	0.04
Total Fe (g kg ⁻¹)	0.83	0.83	1.85	0.22	2.50	0.82	0.79	0.78	0.80	0.25
Total Mg (g kg ⁻¹)	12	12	5.1	1.6	15	12	13	12	12	3.5
Total Mn (g kg ⁻¹)	0.22	0.22	0.11	0.01	0.28	0.23	0.24	0.23	0.24	0.07
Total Na (g kg ⁻¹)	5.5	5.4	0.4	1.7	7.1	5.1	5.6	5.2	5.2	1.7
Total Z (g kg ⁻¹)	0.35	0.35	0.08	0.06	0.14	0.29	0.32	0.32	0.32	0.28

^a Partially dried to ~45% total solids at 60°C

^b Total N measured by combustion analysis

^c Total N calculated as sum of total Kjeldahl N and NO₃-N

^d Organic N estimated as total N – (NH₄-N + NO₃-N)

^e Organic N is estimated as total Kjeldahl N – NH₄-N

Table S2. Bioassay germination rates, survival rates, root dry biomass, shoot dry biomass and total dry biomass by amendment and application rate (mean \pm 1 SD). Groups share a letter if the difference in means was not statistically significant ($P > 0.05$). $n = 6$ trays of 16 seedlings for germination and survival and $n = 24$ seedlings for root biomass, shoot biomass and total biomass.

Plant	Amendment	Application Rate	Germination (%)	Survival (%)	Root Biomass (mg dry)	Shoot Biomass (mg dry)	Total Biomass (mg dry)
tomato	control	0	93 \pm 5 ^{ab}	98 \pm 6 ^a	9 \pm 2 ^d	17 \pm 3 ^d	26 \pm 5 ^d
tomato	Market Alternative	2	84 \pm 7 ^b	89 \pm 9 ^a	51 \pm 11 ^a	139 \pm 38 ^a	190 \pm 47 ^a
tomato	Plant Food B	2	94 \pm 4 ^{ab}	99 \pm 3 ^a	23 \pm 6 ^{cd}	63 \pm 17 ^{cd}	86 \pm 21 ^{cd}
tomato	Plant Food B	4	94 \pm 0 ^{ab}	97 \pm 6 ^a	30 \pm 6 ^{bc}	90 \pm 19 ^{bc}	120 \pm 24 ^{bc}
tomato	Plant Food B	6	91 \pm 5 ^{ab}	100 \pm 0 ^a	38 \pm 7 ^{ab}	115 \pm 21 ^{ab}	152 \pm 27 ^{ab}
tomato	Plant Food B	8	97 \pm 5 ^a	96 \pm 8 ^a	37 \pm 9 ^{ab}	114 \pm 27 ^{ab}	150 \pm 35 ^{ab}
tomato	Plant Food B	10	96 \pm 5 ^a	93 \pm 0 ^a	37 \pm 10 ^{ab}	110 \pm 28 ^{ab}	147 \pm 38 ^{ab}
tomato	Plant Food B	12	91 \pm 3 ^{ab}	92 \pm 9 ^a	33 \pm 14 ^b	107 \pm 44 ^{ab}	141 \pm 57 ^{ab}
marigold	control	0	98 \pm 3 ^a	100 \pm 0 ^a	10 \pm 2 ^c	17 \pm 3 ^d	27 \pm 5 ^d
marigold	Market Alternative	2	96 \pm 5 ^a	80 \pm 24 ^{ab}	51 \pm 16 ^a	127 \pm 38 ^a	178 \pm 52 ^{ab}
marigold	Plant Food A	2	99 \pm 3 ^a	100 \pm 0 ^a	33 \pm 8 ^b	69 \pm 15 ^{cd}	102 \pm 22 ^{cd}
marigold	Plant Food A	4	98 \pm 3 ^a	97 \pm 3 ^{ab}	44 \pm 10 ^{ab}	99 \pm 19 ^{abc}	143 \pm 26 ^{abc}
marigold	Plant Food A	6	99 \pm 3 ^a	92 \pm 5 ^{ab}	38 \pm 15 ^{ab}	88 \pm 31 ^{cb}	125 \pm 45 ^{bc}
marigold	Plant Food A	8	97 \pm 5 ^a	82 \pm 12 ^b	46 \pm 13 ^{ab}	114 \pm 29 ^{ab}	160 \pm 40 ^{ab}
marigold	Plant Food A ₁	6	99 \pm 3 ^a	90 \pm 7 ^{ab}	48 \pm 17 ^a	113 \pm 33 ^a	161 \pm 48 ^{ab}
marigold	Plant Food A ₂	6	100 \pm 0 ^a	83 \pm 14 ^{ab}	52 \pm 12 ^a	121 \pm 21 ^{ab}	174 \pm 31 ^a

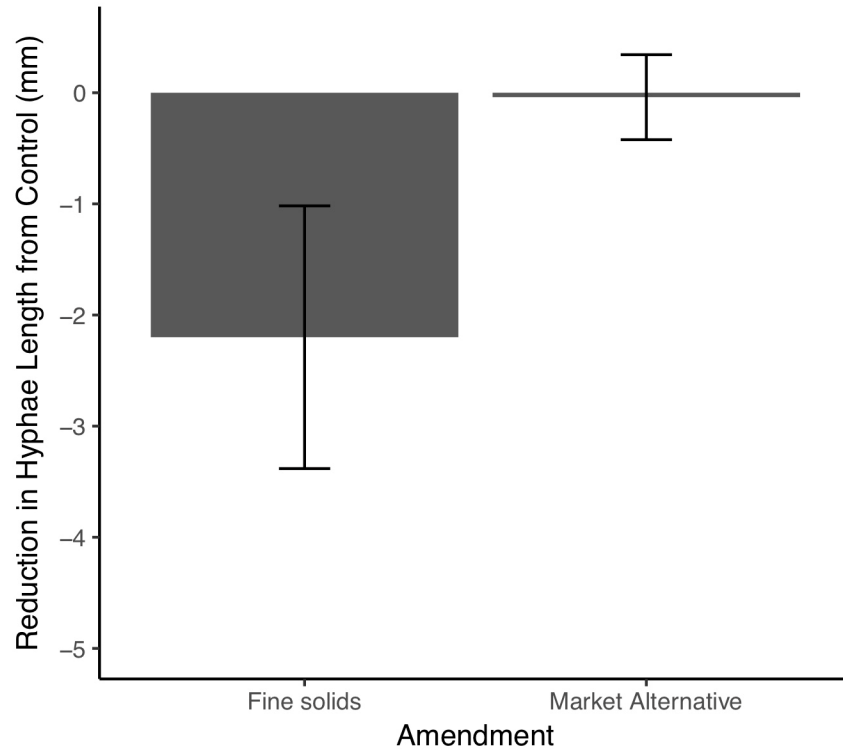


Figure S1. Disease suppression potential of as-is fine solids and the market alternative ($n = 5$ per amendment). Negative values represented suppressive potential.