Supplementary Information for

Biochar formulation influences soil chemical properties and early growth response of *Eucalyptus globulus* to fertilization

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Table S1 Treatments, application rates, and number of plants per treatment

Treatment	Description	Soil (L)	Biochar (L)	Fertilizer NPK + SP42% (g plant^{-1})	Number of plants (flat)	Number of plants (terraces)
T0	Control (no NPK)	14.1	–	–	15	–
T0A	Control + NPK	14.1	–	30 + 60	15	12
T1	Biochar Pure (no NPK)	12.9	1.2	–	15	–
T2	Biochar Pure + NPK	12.9	1.2	30 + 60	15	–
T3	Biochar Plus (no NPK)	12.9	1.2	–	15	12
T4	Biochar Plus + NPK	12.9	1.2	30 + 60	15	12

Table S2 Schedule of monitoring activities planned for the Biochar trial, installed on June 20, 2016

Activity	1 month after planting	5 months after planting	12 months after planting
Survival assessment + replanting	X		
Soil sampling		X	X
Height assessment	X	X	X

Note: Initial survival was assessed one month after planting and before replacement of dead seedlings. Survival in the flat area was 87% in T0, 93% in T0A and T1, and 100% in T2, T3, and T4. In the terraced area, survival was 100% in T0A, 92% in T3, and 100% in T4.

Table S3 Soil chemical analysis and soil fertility monitoring results at the first post-planting soil sampling, approximately 5 months after planting, and at 12 months after planting in the flat and terraced areas. Different lowercase letters within the same area, sampling time, and variable indicate significant differences among treatments according to Tukey's HSD test ($p < 0.05$; $n = 3$). Initial values are contextual area-level baselines and were not included in the treatment ANOVA. Abbreviations: OM = organic matter (%); OC = organic carbon (%); P = available phosphorus (mg kg^{-1}, Egner–Riehm extraction); N = total nitrogen (%); Ca, Mg, K, and Na = soil exchangeable bases ($cmol_c$ kg^{-1}); CEC = cation exchange capacity ($cmol_c$ kg^{-1}); Zn, Cu, Mn, Fe, and B = extractable micronutrients (mg kg^{-1}). Block-level SD/SE values and Tukey's HSD critical differences are not reported because the underlying block-level observations and ANOVA error terms were not retained in the archived dataset.

Date	Area	Treatment	pH	OM	OC	P	N	Ca	Mg	K	Na	CEC	Zn	Cu	Mn	Fe	B
After 5 months	Flat	Initial	5.2	6.5	3.77	6.6	0.21	0.1	0.16	0.1	0.06	3.1	1.29	0.49	1.28	139.2	0.72
		T0	5.2bc	6.7b	3.89b	6.4bc	0.15a	0.13b	0.25b	0.22b	0.15a	3.2c	0.97a	0.33a	1.30bc	63.3a	1.87a
		T0A	4.9c	7.0b	4.06b	33.6ab	0.16a	0.20b	0.39ab	0.68ab	0.15a	3.8bc	0.97a	0.20a	1.13c	59.0a	2.23a
		T1	5.5a	10.5a	6.09a	4.4c	0.16a	0.70b	0.31ab	0.21b	0.53a	3.7bc	0.80a	0.23a	5.97a	61.8a	1.37a
		T2	5.5ab	9.2ab	5.34ab	21.3abc	0.16a	0.55b	0.36ab	0.45b	0.16a	3.4c	0.80a	0.20a	3.77ab	60.1a	2.13a
		T3	5.8a	8.0ab	4.64ab	22.0abc	0.17a	3.12a	0.56a	1.06a	0.32a	6.2bc	2.67a	0.40a	5.20a	52.5a	1.23a
		T4	5.5ab	8.5ab	4.93ab	44.8a	0.17a	2.30a	0.56a	0.96a	0.26a	5.6ab	2.23a	0.40a	4.97ab	59.0a	1.53a
	Terrace	Initial	4.9	10.3	5.97	7.9	0.52	0.19	0.46	0.19	0.11	5.1	2.84	1.46	5.36	170.6	1.1
		T0A	5.0c	11.3a	6.55a	36.1a	0.28a	0.28b	0.75a	0.92a	0.21b	5.9b	1.53b	0.43a	4.90a	89.9a	2.77a
		T3	5.8a	18.5a	10.73a	104.8a	0.32a	5.23a	1.93a	1.70a	0.54a	10.6ab	7.23ab	1.80a	18.83a	78.2a	1.47a
		T4	5.4b	16.0a	9.28a	156.2a	0.31a	4.32a	1.82a	1.85a	0.42a	10.5a	6.30a	0.73a	17.77a	86.0a	2.90a
After 12 months	Flat	Initial	5.2	6.5	3.77	6.6	0.21	0.1	0.16	0.1	0.06	3.1	1.29	0.49	1.28	139.2	0.72
		T0	4.9ab	6.9b	4b	11.5a	0.17a	0.12b	0.24ab	0.14a	0.09a	3.05a	1.14a	0.61a	1.41b	182.2a	0.87a
		T0A	4.7b	6.8b	3.94b	50.5a	0.20a	0.12b	0.51a	0.29a	0.10a	3.83a	1.50a	0.61a	1.47b	160.5a	1.41a
		T1	5.4a	9.5ab	5.51b	16.3a	0.19a	0.47a	0.34ab	0.31a	0.09a	2.92a	1.32a	0.75a	3.99a	163.0a	1.07a
		T2	5.0ab	9.9a	5.74a	47.7a	0.20a	0.12b	0.25ab	0.21a	0.10a	3.06a	1.23a	0.64a	2.64ab	151.1a	0.98a
		T3	5.1ab	9.2ab	5.34ab	20.4a	0.19a	0.43a	0.23b	0.27a	0.14a	3.29a	2.11a	0.90a	1.82ab	245.3a	0.81a
		T4	4.8b	7.6ab	4.41ab	36.4a	0.19a	0.13b	0.30ab	0.20a	0.13a	3.39a	1.97a	0.84a	1.20b	158.1a	1.36a
	Terrace	Initial	4.9	10.3	5.97	7.9	0.52	0.19	0.46	0.19	0.11	5.1	2.84	1.46	5.36	170.6	1.1
		T0A	4.7ab	10.1a	5.86a	36.5a	0.35a	0.22a	0.81a	0.57a	0.15b	5.49a	2.08b	1.28b	5.56a	212.5a	1.36a
		T3	5.0a	15.7a	9.11a	32.1a	0.37a	1.35a	0.64a	0.44a	0.32a	5.87a	5.29ab	1.57b	8.36a	298.5a	1.09a
		T4	4.7b	17.3a	10.03a	125.8a	0.46a	1.15a	1.32a	0.57a	0.27a	6.61a	6.51a	2.11a	10.80a	283.3a	3.05a

Table S4 Relative changes (%) in soil chemical properties at 12 months relative to the area-specific reference treatment. T0 was used as the reference in the flat area, whereas T0A was used in the terraced area because no unfertilized control was established there.

Area	**Flat**	**Flat**	**Flat**	**Flat**	**Flat**	**Terrace**	**Terrace**
Treatment	**T0A (Control with NPK)**	**T1 (Biochar without NPK)**	**T2 (Biochar with NPK)**	**T3 (Biochar Plus without NPK)**	**T4 (Biochar Plus with NPK)**	**T3 (Biochar Plus without NPK)**	**T4 (Biochar Plus with NPK)**
pH	−4.1	10.2	2	4.1	−2	6.4	0
OM	−1.4	37.7	43.5	33.3	10.1	55.4	71.3
OC	−1.5	37.7	43.5	33.5	10.3	55.5	71.2
P	339.1	41.7	314.8	77.4	216.5	−12.1	244.7
N	17.6	11.8	17.6	11.8	11.8	5.7	31.4
Ca	0	291.7	0	258.3	8.3	513.6	422.7
Mg	112.5	41.7	4.2	−4.2	25	−21	63
K	107.1	121.4	50	92.9	42.9	−22.8	0
Na	11.1	0	11.1	55.6	44.4	113.3	80
CEC	25.6	−4.3	0.3	7.9	11.1	6.9	20.4
Zn	31.6	15.8	7.9	85.1	72.8	154.3	213
Cu	0	23	4.9	47.5	37.7	22.7	64.8
Mn	4.3	183	87.2	29.1	−14.9	50.4	94.2
Fe	−11.9	−10.5	−17.1	34.6	−13.2	40.5	33.3
B	62.1	23	12.6	−6.9	56.3	-19.9	124.3