

# **Supplementary Materials**

## **Poultry Litter Biochar as Gentle Soil Amendments of a Multi-Contaminated Soil: C Sequestration and Nutrient Release**

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**Table S1.** Cumulative C mineralized during the incubation period (mg CO<sub>2</sub>-C [kg soil]<sup>-1</sup>). In each column, mean values followed by the same letter do not differ significantly ( $p < 0.05$ ).

Treatments <sup>1</sup>	Day 0	Day 1	Day 2	Day 3	Day 5	Day 9	Day 17	Day 31	Day 56
Control	89.7 o	176 m	247 m	299 m	376 m	492 m	635 m	758 m	914 o
P2-1	198 i	496 h	786 g	981 g	1201 g	1463 g	1750 g	2004 f	2332 h
P2-5	496 d	1603 c	2927 c	3829 c	4728 c	5599 c	6458 c	7100 c	7928 c
P2-10	735 a	2693 a	5060 a	7246 a	9188 a	10863 a	12607 a	13807 a	15187 a
P3-1	185 j	441 i	712 h	888 h	1104 h	1351 h	1625 h	1855 g	2158 i
P3-5	445 e	1377 e	2581 d	3366 d	4172 d	4958 d	5732 d	6309 d	7040 e
P3-10	588 b	2031 b	4261 b	6165 b	8060 b	9719 b	11255 b	12391 b	13625 b
P4-1	153 l	322 k	471 jk	581 j	718 j	890 j	1115 j	1323 i	1599 k
P4-5	369 f	901 f	1388 f	1722 f	2102 f	2542 f	3039 f	3475 e	4018 f
P4-10	560 c	1504 d	2428 e	3135 e	3881 e	4663 e	5540 e	6268 d	7230 d
P5-1	124 m	245 l	329 l	395 l	486 l	627 l	817 l	979 k	1181 m
P5-5	218 h	421 ij	558 i	658 i	789 i	984 i	1250 i	1495 h	1815 j
P5-10	302 g	599 g	789 g	914 h	1105 h	1378 h	1718 h	2051 f	2487 g
P6-1	107 n	212 l	293 lm	352 lm	436 lm	568 l	745 l	895 l	1084 n
P6-5	164 k	310 k	413 k	475 k	566 k	728 k	951 k	1166 j	1454 l
P6-10	216 h	396 j	528 ij	610 ij	731 ij	926 ij	1196 i	1447 h	1798 j

<sup>1</sup>: P2, P3, P4, P5, P6 = poultry litter pyrolyzed at 200, 300, 400, 500, and 600°C; -1 = 1% biochar addition; -5 = 5% biochar addition; -10 = 10% biochar addition.

**Table S2.** Significant difference of CO<sub>2</sub>-C release of nine times monitoring between addition rates and treats compared to the control during 56 days of incubation.

Treats	n	Day 0	Day 1	Day 2	Day 3	Day 5	Day 9	Day 17	Day 30	Day 56
		mg kg <sup>-1</sup>	mg kg <sup>-1</sup>	mg kg <sup>-1</sup>	mg kg <sup>-1</sup>	mg kg <sup>-1</sup>	mg kg <sup>-1</sup>	mg kg <sup>-1</sup>	mg kg <sup>-1</sup>	mg kg <sup>-1</sup>
<i>Rate</i>										
Control	3	89.7 d <sup>1</sup>	86.0 d	71.3 d	52.3 d	76.7 d	117 d	142 d	123 d	156 d
1%	15	153 c	190 c	175 c	121 c	150 c	191 c	231 c	201 c	259 c
5%	15	338 b	584 b	651 b	437 b	461 b	491 b	524 b	423 b	542 b
10%	15	480 a	965 a	1169 a	1001 a	979 a	917 a	953 a	730 a	872 a
<i>Treat</i>										
Control	3	89.7 f	86.0 f	71.3 f	52.3 f	76.7 e	117 f	142 f	123 f	156 f
P2	9	476 a	1121 a	1327 a	1094 a	1021 a	936 a	963 a	698 a	845 a
P3	9	406 b	877 b	1235 b	955 b	971 b	898 b	861 b	648 b	756 b
P4	9	361 c	548 c	520 c	383 c	421 c	465 c	533 c	458 c	593 c
P5	9	215 d	207 d	137 d	97.4 d	137 e	203 d	266 d	246 d	319 d
P6	9	162 e	143 e	106 e	67.2 e	98.8 e	163 e	223 e	205 e	276 e

<sup>1</sup> Means followed by different lowercase letter are significantly different for each parameter in the rate column and treat column ( $p < 0.01$ ).

**Table S3.** Significant test of cumulative CO<sub>2</sub>-C, and water extraction solution pH and electrical conductivity after 56 days incubation.

Treats <sup>1</sup>	Cumulative CO <sub>2</sub> -C <sup>2</sup>		pH		Electrical conductivity	
	Mean±SD (mg kg <sup>-1</sup> )	Change (%) <sup>2</sup>	Mean±SD	Change (%) <sup>2</sup>	Mean±SD (dS m <sup>-1</sup> )	Change (%) <sup>2</sup>
Control	914±24 o <sup>3</sup>		4.4±0.07 k		0.8±0.02 l	
P2-1	2332±46 h	155	4.6±0.07 j	3	1.2±0.01 k	54
P2-5	7928±26 c	768	5.5±0.06 g	24	2.5±0.03 h	211
P2-10	15187±88 a	1562	6.5±0.02 d	47	3.5±0.01 d	328
P3-1	2158±54 i	136	4.9±0.02 hi	10	1.2±0.02 k	54
P3-5	7040±9 e	671	6.3±0.01 f	41	2.5±0.03 h	211
P3-10	13625±122 b	1391	6.6±0.03 c	49	3.7±0.03 c	354
P4-1	1599±66 k	75	4.8±0.01 i	9	1.3±0.02 jk	58
P4-5	4018±71 f	340	6.3±0.03 f	41	2.7±0.08 g	240
P4-10	7230±101 d	691	6.7±0.03 b	51	4.0±0.03 b	393
P5-1	1181±41 m	29	4.9±0.02 hi	10	1.3±0.00 i	65
P5-5	1815±12 j	99	6.5±0.04 e	45	3.2±0.05 e	291
P5-10	2487±38 g	172	6.9±0.04 a	54	4.9±0.00 a	507
P6-1	1084±40 n	19	4.9±0.02 h	11	1.3±0.01 ij	64
P6-5	1454±24 l	59	6.5±0.01 d	47	3.0±0.03 f	276
P6-10	1798±17 j	97	6.9±0.02 a	55	4.9±0.00 a	502

<sup>1</sup>: P2, P3, P4, P5, P6 = poultry litter pyrolyzed at 200, 300, 400, 500, and 600°C; -1 = 1% biochar addition; -5 = 5% biochar addition; -10 = 10% biochar addition; <sup>2</sup>: Percentage expressed as the difference of value between biochar amended treatments and un-amended control treatment; 0% indicates as No change in amount of those properties due to biochar addition; <sup>3</sup>: Means (n =3) compared within a column followed by a different lowercase letter are significantly different at p < 0.05 using a one-way ANOVA.