

Supplementary Table S1 Statistical results of heterogeneity for each group: biochar properties (BC) and composting conditions (CP)

Indicators	Variables γ	Number of study	df ^{α}	Q _M ^{β}	p	Indicators	Variables γ	Number of study	df ^{α}	Q _M ^{β}	p
CO ₂	TC _{BC}	101	1	1.395628	0.497672	CH ₄	TC _{BC}	74	1	27.886488	0.000001
	TN _{BC}	110	1	1.375836	0.502621		TN _{BC}	84	1	41.618836	0.000000
	C/N _{BC}	91	1	1.847981	0.396932		C/N _{BC}	70	1	37.938627	0.000000
	MC _{BC}	68	1	4.245261	0.119716		MC _{BC}	76	1	13.780577	0.001018
	pH _{BC}	95	2	27.769203	0.000004		pH _{BC}	77	2	26.073910	0.000009
	EC _{BC}	52	1	5.306964	0.070406		EC _{BC}	47	1	9.817459	0.007382
	SSA _{BC}	59	1	119.624321	0.000000		SSA _{BC}	42	1	120.016064	0.000000
	PS _{BC}	60	2	4.384672	0.222811		PS _{BC}	42	2	48.608048	0.000000
	FT _{BC}	136	3	13.289629	0.009944		FT _{BC}	106	3	70.190262	0.000000
	AR _{BC}	124	2	112.267144	0.000000		AR _{BC}	98	2	1315.750606	0.000000
	C/N _{CP}	114	2	1951.718965	0.000000		C/N _{CP}	87	2	289.081604	0.000000
	MC _{CP}	98	2	15.416649	0.001493		MC _{CP}	84	2	44.789711	0.000000
	pH _{CP}	100	2	677.737628	0.000000		pH _{CP}	89	2	822.230117	0.000000
	EC _{CP}	55	1	109.688582	0.000000		EC _{CP}	59	1	210.295216	0.000000
	RV _{CP}	128	1	4.686785	0.096001		RV _{CP}	98	1	25.430044	0.000003
	VI _{CP}	135	1	2.358928	0.307443		VI _{CP}	110	1	28.102053	0.000001
N ₂ O	FT _{CP}	143	2	19.525673	0.000213	NH ₃	FT _{CP}	112	2	37.867010	0.000000
	TC _{BC}	95	1	14.558096	0.000690		TC _{BC}	130	1	8.920816	0.011558
	TN _{BC}	108	1	48.484497	0.000000		TN _{BC}	140	1	65.061992	0.000000
	C/N _{BC}	87	1	33.937181	0.000000		C/N _{BC}	121	1	26.871773	0.000001
	MC _{BC}	82	1	14.046827	0.000891		MC _{BC}	107	1	193.505555	0.000000
	pH _{BC}	96	2	75.773081	0.000000		pH _{BC}	131	2	58.571945	0.000000
	EC _{BC}	51	1	10.027233	0.006647		EC _{BC}	76	1	36.999681	0.000000
	SSA _{BC}	61	1	9.885665	0.007134		SSA _{BC}	91	1	11.360875	0.003412
	PS _{BC}	55	2	10.3457247	0.0158448		PS _{BC}	67	2	10.453693	0.015078
	FT _{BC}	136	3	50.462248	0.000000		FT _{BC}	169	3	105.363560	0.000000
	AR _{BC}	134	2	25432.976849	0.000000		AR _{BC}	159	2	1515.767741	0.000000
	C/N _{CP}	114	2	104.203971	0.000000		C/N _{CP}	159	2	494.649575	0.000000
	MC _{CP}	109	2	197.418419	0.000000		MC _{CP}	134	2	25.056805	0.000015
	pH _{CP}	110	2	397.025804	0.000000		pH _{CP}	138	2	225.787619	0.000000
	EC _{CP}	65	1	242.145733	0.000000		EC _{CP}	86	1	170.999025	0.000000
	RV _{CP}	131	1	36.000876	0.000000		RV _{CP}	164	1	19.653160	0.000054
	VI _{CP}	141	1	34.343011	0.000000		VI _{CP}	174	1	21.039976	0.000027
	FT _{CP}	142	2	36.697317	0.000000		FT _{CP}	181	2	25.496970	0.000012

^{α} df: degrees of freedom.

^{β} Q_M: between-group heterogeneity. Significant Q_M ($P < 0.05$) indicates statistically differences in lnRR values of the target indicator variable across different categorical groups.

γ total carbon (TC), total nitrogen (TN), carbon-nitrogen ratio (C/N), moisture content (MC), electric conductivity (EC), specific surface area (SSA), particle size (PS), feedstock type (FT), application rate (AR), reactor volume (RV), ventilation instrument (VI).