

[Supplementary Information]

Table S1: Rock-Eval[®] parameter of soils, biochars, biochar-soil mixtures and lignin: total carbon (TC), hydrocarbon (HC), CO and CO₂ emissions during pyrolysis (pyr) and oxidation (oxi) stages.

	Soil	Biochar	Ratio %	TC <i>mg C g⁻¹</i>	HCpyr	COpyr	CO ₂ pyr	CO ₂ oxi	CO ₂ oxi
				----- %TC -----					
Soil	Soil A		0	6.9	12.2	4.2	14.5	5.3	63.8
	Soil B		0	10.0	10.0	3.9	16.5	3.6	66.0
	Soil C		0	24.2	3.3	1.6	8.0	1.5	85.6
	Soil D		0	60.7	14.2	3.0	12.9	2.7	67.2
Biochar		Herbaceous	100	807.2	1.3	1.6	1.1	16.7	79.3
		Maize	100	659.6	0.5	1.3	2.5	11.5	84.2
		Compost	100	580.6	0.5	1.3	3.3	8.9	86.0
		Miscanthus	100	764.9	0.0	0.5	1.0	18.1	80.3
		Wood	100	791.8	0.9	2.4	1.6	24.6	70.6
		Rapeseed	100	657.5	0.0	0.7	2.4	8.9	88.0
Mixture	Soil A	Herbaceous	0,05	7.4	11.5	4.2	14.0	6.0	64.4
			0,10	7.4	11.5	3.9	12.1	7.4	65.2
			0,20	8.3	10.2	3.6	10.9	7.8	67.6
			0,51	10.4	8.2	3.3	8.9	9.3	70.3
			1,01	15.0	5.9	2.7	7.1	9.7	74.6
	Soil B	Herbaceous	0,05	10.4	10.1	3.8	15.4	4.1	66.7
			0,10	10.7	9.6	3.6	13.9	4.3	68.6
			0,19	11.4	9.0	3.6	13.7	4.0	69.8
			0,51	13.7	8.1	3.2	11.5	6.5	70.7
			1,01	18.0	6.1	2.7	8.9	5.8	76.4
	Soil C	Herbaceous	0,05	25.3	3.2	1.6	7.8	1.8	85.6
			0,10	24.9	3.2	1.6	7.7	2.2	85.3
			0,21	25.8	3.0	1.5	7.6	2.1	85.8
			0,50	27.8	2.9	1.5	7.1	3.0	85.4
			1,03	33.0	2.6	1.5	6.0	5.8	84.2
Soil D	Herbaceous	0,05	59.4	14.1	3.1	12.9	3.4	66.6	
		0,11	60.1	14.3	3.1	12.6	2.9	67.1	
		0,20	61.1	14.0	3.0	12.2	3.8	67.1	
		0,50	64.0	13.3	2.9	12.0	2.6	69.0	
		1,02	67.1	12.7	2.8	11.4	3.4	69.7	
	Maize	0,05	7.3	11.5	4.0	14.7	6.0	63.8	
		0,10	7.5	11.1	3.8	12.9	6.9	65.3	
		0,20	8.3	9.9	3.7	12.4	7.7	66.4	
		0,50	10.4	8.2	3.1	10.1	9.6	69.1	
		1,01	13.3	6.2	2.7	8.2	13.3	69.6	
	Compost	0,05	7.2	11.4	4.1	15.2	5.2	64.1	
		0,10	7.6	11.1	3.8	12.8	6.2	66.1	
		0,20	8.0	10.2	3.6	12.5	6.4	67.2	

		0,50	9.8	8.2	3.3	11.1	7.7	69.6
		1,01	12.6	6.5	2.8	9.4	9.0	72.3
Soil A	Miscanthus	0,05	7.5	11.6	3.9	14.4	6.3	63.8
		0,10	7.6	10.9	3.7	12.3	6.4	66.8
		0,20	8.5	9.7	3.4	11.5	8.1	67.4
		0,50	10.8	7.5	2.7	9.3	10.8	69.7
		1,01	15.2	5.3	2.1	7.3	11.0	74.4
	Wood	0,05	7.6	11.4	3.9	14.3	6.2	64.1
		0,10	7.7	10.7	3.9	12.6	7.2	65.5
		0,20	8.4	9.7	3.7	11.9	8.3	66.3
		0,50	10.9	7.8	3.6	9.8	10.4	68.4
		1,01	14.7	6.3	3.2	7.5	12.0	71.0
Rapeseed	0,05	7.3	11.5	4.1	14.9	5.9	63.6	
	0,10	7.8	10.6	3.6	12.8	5.8	67.1	
	0,20	8.3	10.0	3.5	12.4	5.7	68.4	
	0,50	10.0	8.0	2.9	10.9	6.3	71.9	
	1,00	13.4	5.9	2.2	9.0	7.6	75.3	
Lignin	-	-	291.0	49.3	7.3	8.4	9.7	25.3

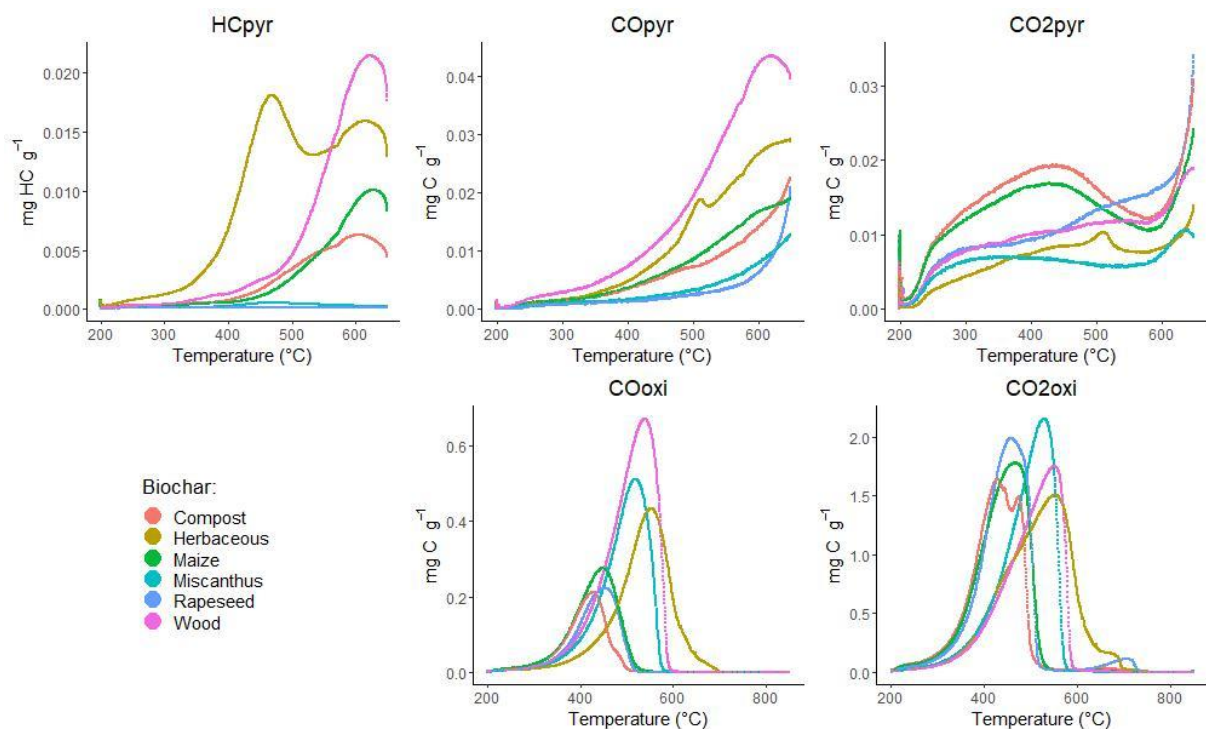


Figure S1: Hydrocarbon (HC), CO and CO₂ emissions during pyrolysis (pyr) and oxidation (oxi) stages of Rock-Eval[®] analysis of biochars.

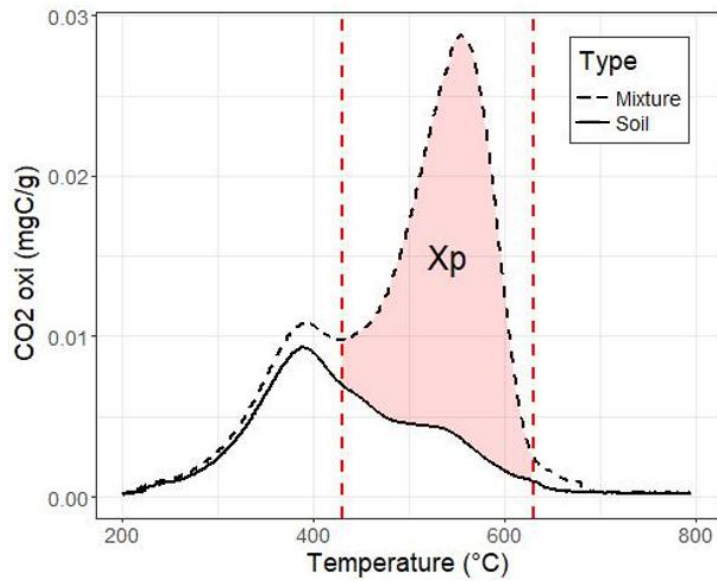


Figure S2: Area cutting of CO₂oxi thermogram from soil A and from a mixture of soil A and miscanthus biochar at 1 % biochar/soil ratio. Xp corresponds to the emissions of biochar-C, i.e. to biochar-Corg_{TR}.

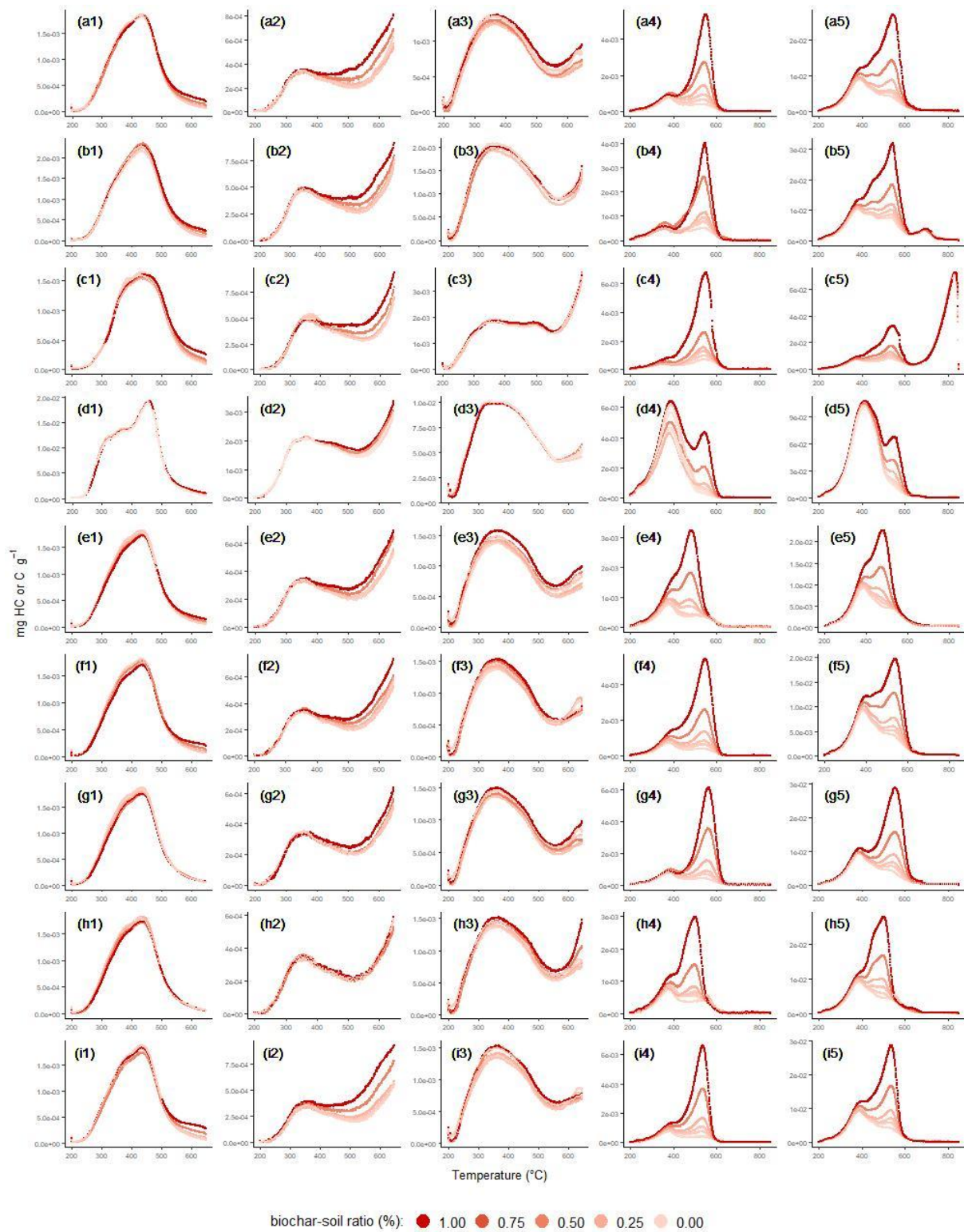


Figure S3: CO₂ emissions during oxidation stage of Rock-Eval[®] analysis of all mixtures. Letters 1-5 represent the C emissions in the following order: hydrocarbon, CO and CO₂ emissions during pyrolysis and CO and CO₂ emissions during oxidation. All mixtures and their corresponding pure soils are represented: herbaceous biochar-soil A (a1-5), herbaceous biochar-soil B (b1-5), herbaceous

biochar-soil C (c1-5), herbaceous biochar-soil D (d1-5), compost biochar-soil A (e1-5), maize biochar-soil A (f1-5), miscanthus biochar-soil A (g1-5), rapeseed biochar-soil A (h1-5), wood biochar-soil A (i1-5).

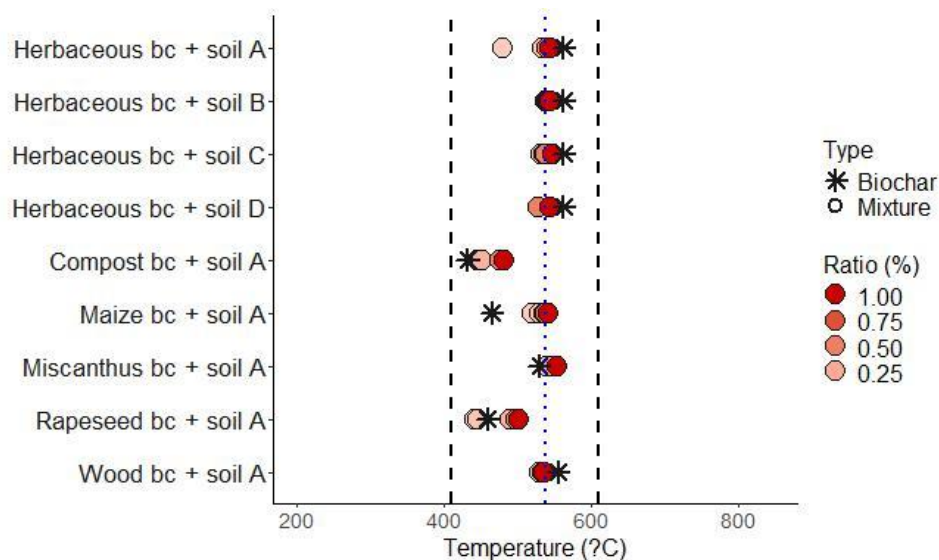


Fig. S4: Peak temperature of the CO₂oxi peak attributed to biochar, from the biochar-soil mixtures and their corresponding pure biochar. The dotted blue line corresponds to the peak temperatures of lignin (539 °C).

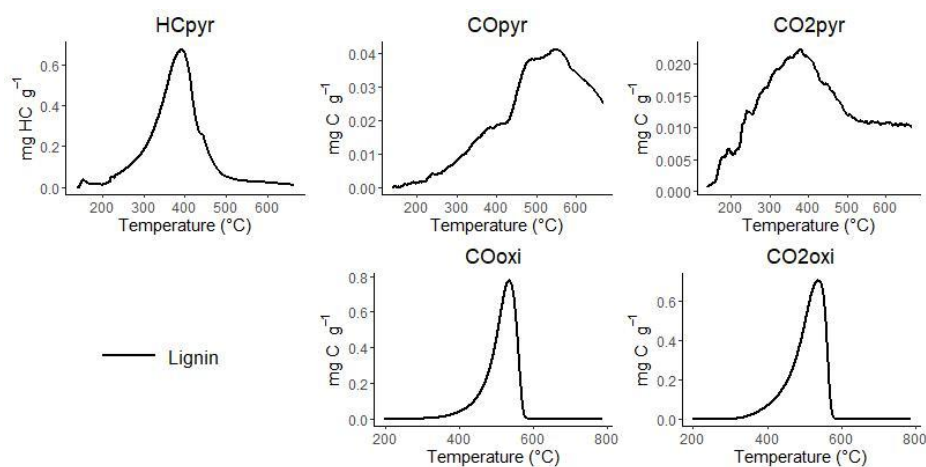


Fig. S5: Hydrocarbon (HC), CO and CO₂ emissions during pyrolysis (pyr) and oxidation (oxi) stages of Rock-Eval[®] analysis of lignin.