Supplementary Material

Biochar Production and Applications in Soil Fertility and Carbon Sequestration-A sustainable solution to Crop-Residue Burning in India

Dinesh Mohan,[1*] Kumar Abhishek,[1] Ankur Sarswat,[1] Manvendra Patel,[1] Prachi Singh[1] and Charles U. Pittman Jr.[2]

[1]School of Environmental Sciences
Jawaharlal Nehru University
New Delhi 110067, India
Email: dm_1967@hotmail.com

Phone: 0091-11-26704616

FAX: 0091-11-26704616

[2]Department of Chemistry
Mississippi State University,
Mississippi State, MS 39762, USA
[1]School of Environmental Sciences

Table SM1. Amendments used in incubation experiments

S. No	Soil amendments with	Code	Amount of biochar used (g)	Ratio [%wt/wt]
1	Rice husk biochar	Soil +RHBC (0.5%)	2.5	0.5
2	Rice husk biochar	Soil +RHBC (1.5%)	7.5	1.5
3	Rice husk biochar	Soil +RHBC (3.0%)	15.0	3.0
4	Rice husk biomass	Soil +RHBM (0.5%)	2.5	0.5
5	Rice husk biomass	Soil +RHBM (1.5%)	7.5	1.5
6	Rice husk biomass	Soil +RHBM (3.0%)	15.0	3.0
7	Corn stover biochar	Soil + CSBC (0.5%)	2.5	0.5
8	Corn stover biochar	Soil + CSBC (1.5%)	7.5	1.5
9	Corn stover biochar	Soil + CSBC (3.0%)	15.0	3.0
10	Corn stover biomass	Soil + CSBM (0.5%)	2.5	0.5
11	Corn stover biomass	Soil + CSBM (1.5%)	7.5	1.5
12	Corn stover biomass	Soil + CSBM (3.0%)	15.0	3.0
13	Soil (Control)	-	-	-

Table SM2: EDXRF of Corn stover biochar (CSBC) and Rice husk biochar (RHBC)*

S. No.	Compounds	Unit	Corn stover biochar	Rice husk biochar
1.	Na_2O	ppm	1153.17	-
2.	Cl	ppm	567.10	588.38
3.	MnO	ppm	124.28	250.69
4.	Fe_2O_3	ppm	402.13	600.63
5.	CuO	ppm	35.52	22.08
6.	ZnO	ppm	26.09	32.43
7.	TiO_2	ppm	47.71	70.85
8.	MgO	% wt	2.50	0.42
9.	SiO_2	% wt	3.12	48.87
10.	P_2O_5	% wt	1.02	-
10.	SO_3	% wt	0.30	0.21

* To maintain uniformity, a number (n=5) of biochar samples were randomly picked from thoroughly mixed (using Quadrate method) bulk biochar. These samples were then mixed well again using quadrate method at least 10 times. Then a small sample size is picked for analysis.

Table SM3: Weekly plant height (cm) influenced by biochar application amounts

Amount of CSBC in soil (Wt. %)	Growth (cm) at the end of each week*						
	1st	2nd	3rd	4th	5th	6th	7th
0.0	6.0 ± 0.6	6.0 ± 0.6	7.2 ± 0.5	7.4 ± 0.6	8.3 ± 0.5	9.0 ± 0.6	9.5 ± 0.7
0.5	7.3 ± 0.5	7.8 ± 0.5	10.7 ± 1.6	12.0 ± 1.7	13.7 ± 0.9	16.3 ± 1.6	17.0 ± 1.5
1.5	7.3 ± 1.7	9.7 ± 0.8	11.5 ± 1.3	13.3 ± 2.8	13.7 ± 3.3	15.7 ± 5.3	16.5 ± 5.7
3.0	8.3 ± 1.5	8.7 ± 1.3	9.9 ± 2.9	10.4 ± 3.5	11.9 ± 5.2	12.4 ± 5.0	20.0 ± 5.9
Amount of RHBC in soil (Wt. %)							
0.0	6.0 ± 0.6	6.0 ± 0.6	7.2 ± 0.5	7.4 ± 0.6	8.3 ± 0.5	9.0 ± 0.6	9.5 ± 0.7
0.5	7.7 ± 1.1	8.5 ± 1.2	9.5 ± 1.4	10.0 ± 1.4	10.6 ± 0.8	11.7 ± 1.5	11.8 ± 1.6
1.5	7.3 ± 2.8	8.2 ± 2.9	10.0 ± 3.4	11.2 ± 3.8	13.2 ± 4.6	14.3 ± 4.8	18.2 ± 6.4
3.0	7.5 ± 1.3	8.6 ± 1.3	10.9 ± 1.6	12.6 ± 1.3	14.4 ± 2.3	15.8 ± 2.8	16.2 ± 2.8

*The data represents are the mean value from three replicates measurements ± standard deviations.

Table SM4: Number of leaves per plant versus time as influenced by biochar application amounts

Amount of CSBC in soil (Wt. %)	Number of leaves at the end of each week**						
	1st	2nd	3rd	4th	5th	6th	7th
0	4.0 ± 0.6	4.0 ± 0.1	4.0 ± 0.6	4.0 ± 0.5	5.0 ± 0.9	6.0 ± 1.2	7.0 ± 1.6
0.5	4.0 ± 0.6	3.0 ± 0.6	4.0 ± 0.6	5.0 ± 0.1	6.0 ± 0.6	6.0 ± 1.1	7.0 ± 1.7
1.5	5.0 ± 1.6	4.0 ± 1.3	5.0 ± 1.7	6.0 ± 1.9	6.0 ± 1.8	6.0 ± 1.9	7.0 ± 1.9
3.0	4.0 ± 1.1	4.0 ± 0.6	5.0 ± 0.1	6.0 ± 0.6	6.0 ± 0.6	6.0 ± 1.0	8.0 ± 0.6
Amount of RHBC in soil (Wt. %)							
0	4.0 ± 0.6	4.0 ± 0.1	4.0 ± 0.6	4.0 ± 0.5	5.0 ± 0.9	6.0 ± 1.2	7.0 ± 1.6
0.5	4.0 ± 0.1	4.0 ± 0.6	4.0 ± 0.7	4.0 ± 0.1	5.0 ± 0.1	6.0 ± 0.1	6.0 ± 0.1
1.5	5.0 ± 0.2	4.0 ± 0.6	5.0 ± 0.6	6.0 ± 0.7	7.0 ± 1.2	6.0 ± 2.1	6.0 ± 2.1
3.0	4.0 ± 0.2	4.0 ± 0.6	5.0 ± 1.6	6.0 ± 1.9	7.0 ± 0.6	7.0 ± 1.7	7.0 ± 2.6

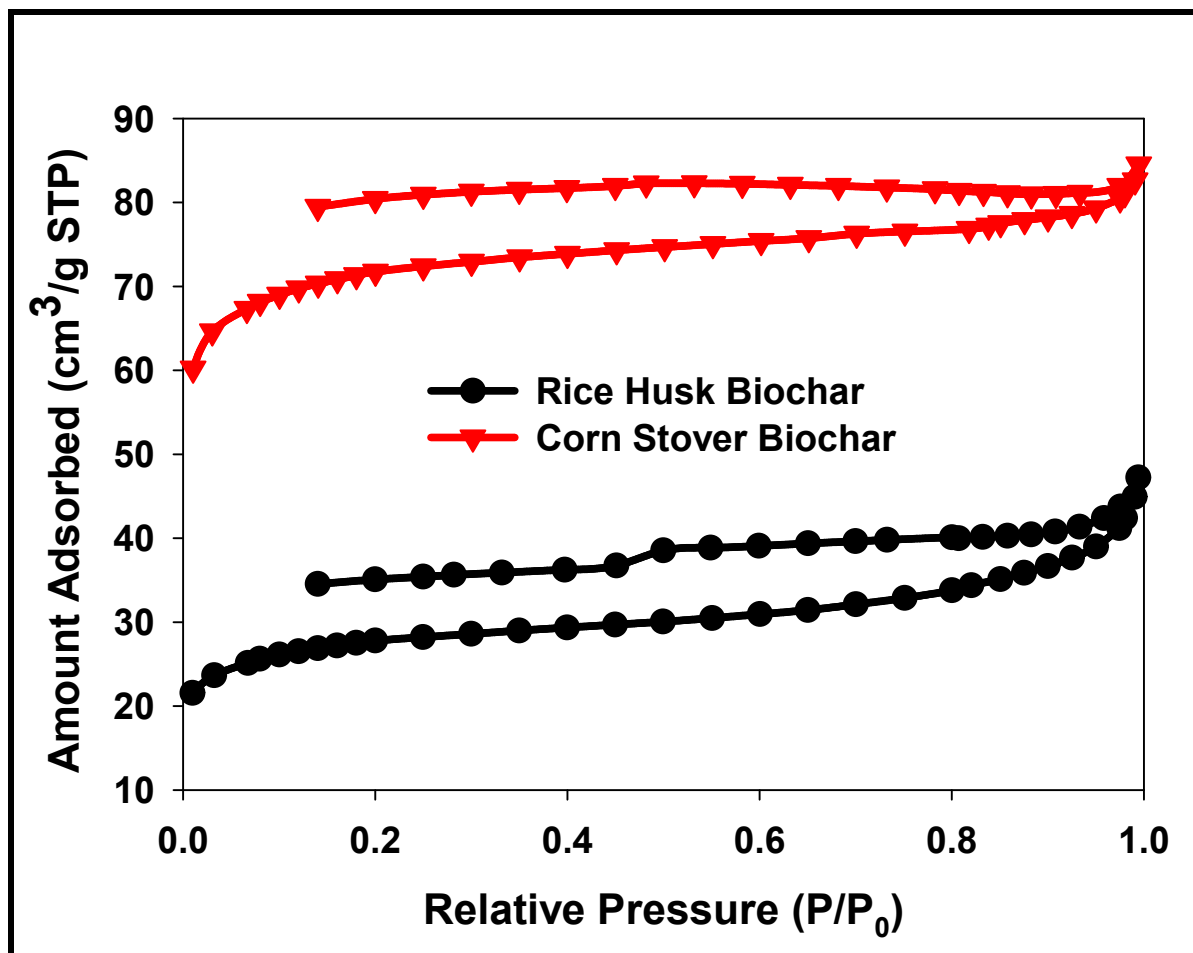**The data represents are the mean value from three replicate measurements ± standard deviations.

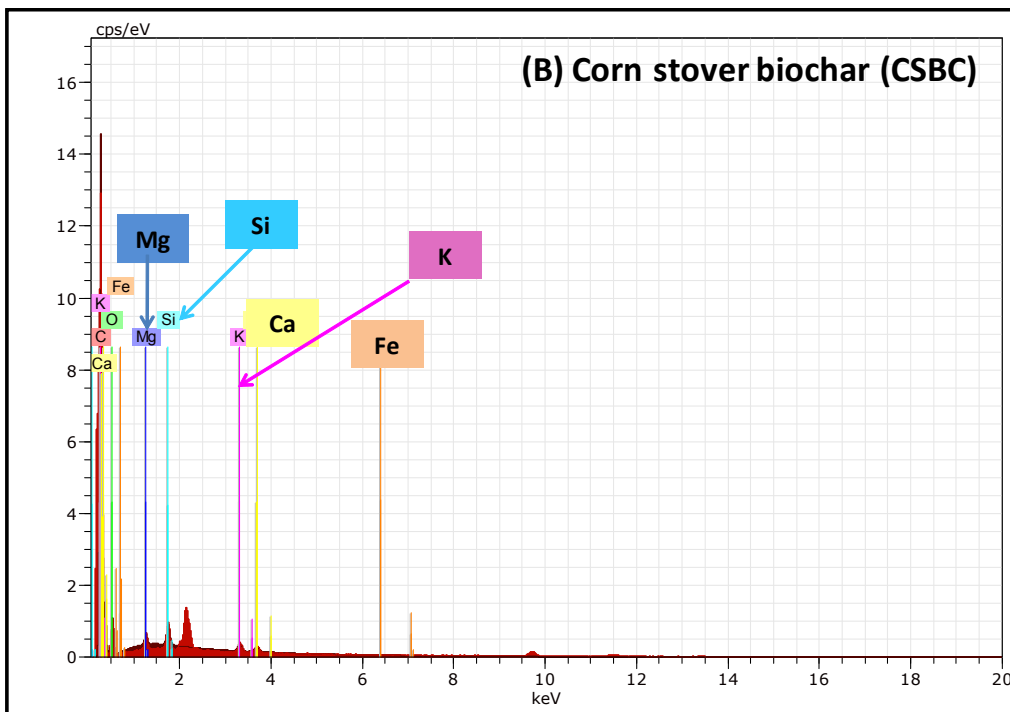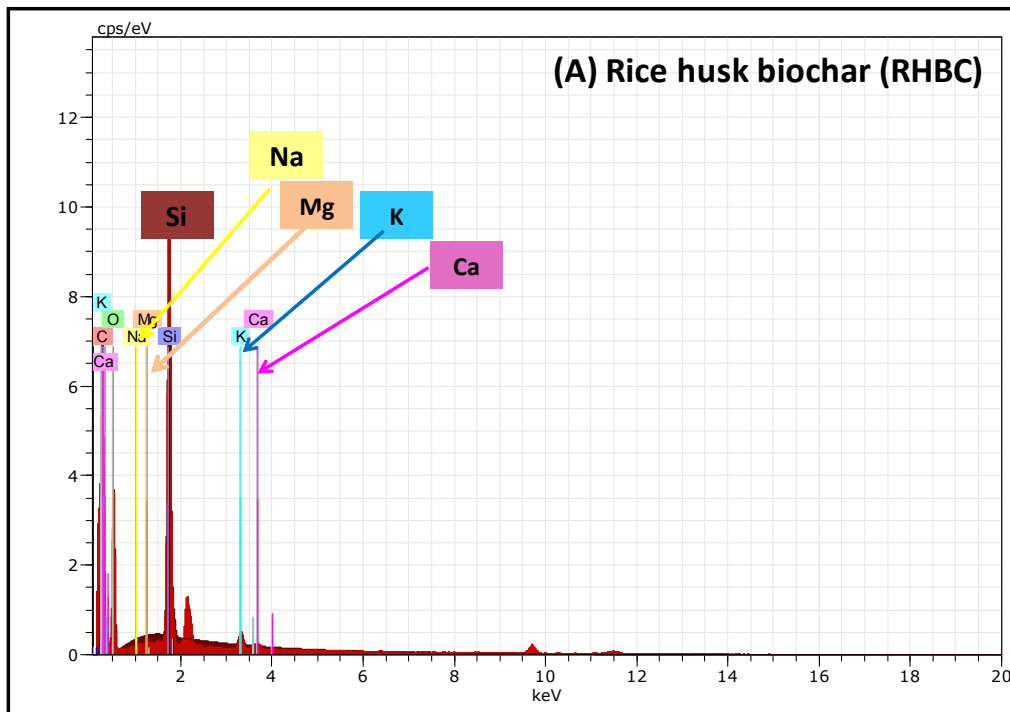**Figure SM1. BET adsorption isotherms**

Figure SM2. EDX spectra of (A) rice husk biochar (RHBC) and (B) corn stover biochar (CSBC).