

# Supplementary Materials: The Role of Biochar Nanoparticles Performing as Nanocarriers for Fertilizers on the Growth Promotion of Chinese Cabbage (*Brassica rapa* (Pekinensis Group))

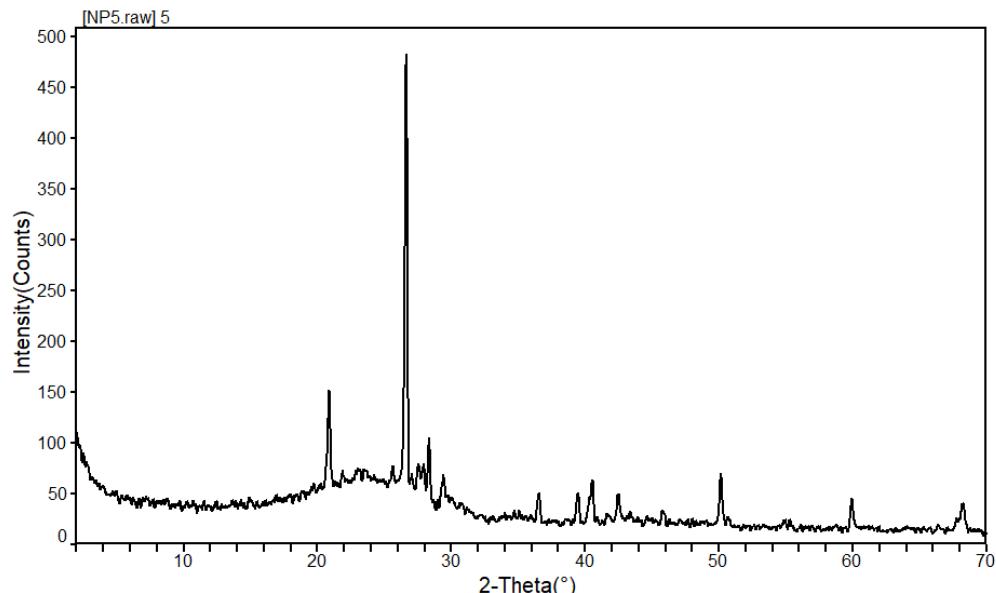
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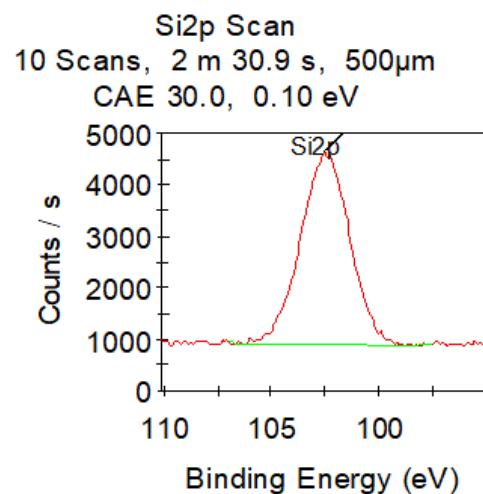
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**Figure S1.** The X-ray diffractometer (XRD) of BNPs.



**Figure S2.** X-ray photoelectron spectroscopy (XPS) of BNPs.

**Table S1.** The Summary of the Surface-Area and the Pore Size of BNPs.

Index	Content
Surface-Area (m <sup>2</sup> /g)	
Single point surface area	46.37
BET Surface Area	53.67
Langmuir Surface Area	76.42
Pore Volume (cm <sup>3</sup> /g)	
Single point adsorption total pore volume	0.12
SF micropore volume	0.01
Pore Size (nm)	
Total adsorption average pore width	9.23
BJH Median pore width	2.21

**Table S2.** Response Surface Model for Screening Experiment.

Treatments	N	P	K
T1	0	0	0
T2	0	2	2
T3	1	2	2
T4	2	0	2
T5	2	1	2
T6	2	2	2
T7	2	3	2
T8	2	2	3
T9	2	2	0
T10	2	2	1
T11	3	2	2
T12	1	3	2
T13	1	1	2
T14	1	2	1
T15	2	1	1

**Table S3.** The Treatments for Experiment of Comparison.

Treatments	Biochar NPs	N	K
T1	1	2	2
T2	2	2	2
T3	2	1	1
T4	2	0.5	0.5
T5	2	0	0
T6	0	2	2

**Table S4.** Plant Weight for Experiment of Comparison.

Treatments	Aboveground Fresh Weight(g)	Underground Fresh Weight(g)	Aboveground Dry Weight(g)	Underground Dry Weight(g)
T1	46.05 ± 2.98 b	2.35 ± 0.29 ab	3.88 ± 0.26 c	0.50 ± 0.05 bc
T2	47.78 ± 1.77 bc	2.17 ± 0.16 ab	3.70 ± 0.03 bc	0.46 ± 0.05 b
T3	62.72 ± 2.80 d	3.67 ± 0.64 bc	4.68 ± 0.27 d	0.78 ± 0.16 d
T4	53.82 ± 1.66 c	5.93 ± 1.54 c	4.54 ± 0.10 d	0.74 ± 0.10 cd
T5	2.55 ± 0.28 a	0.76 ± 0.05 a	0.54 ± 0.05 a	0.10 ± 0.00 a
T6	43.69 ± 2.21 b	3.68 ± 0.66 bc	3.34 ± 0.14 b	0.42 ± 0.06 b

**Table S5.** Nutrient contents for Experiment of Comparison.

<b>Treatments</b>	<b>Calcium</b>	<b>Potassium</b>	<b>Magnesium</b>	<b>Sodium</b>	<b>Phosphorus</b>	<b>Sulphur</b>
Aboveground	T1 29.21 ± 1.93 b	30.10 ± 1.02 c	4.57 ± 0.57 b	5.09 ± 0.24 a	2.18 ± 0.10 b	10.04 ± 0.67 cd
	T2 22.94 ± 3.74 b	27.81 ± 2.27 bc	3.11 ± 0.54 a	5.19 ± 0.37 ab	1.79 ± 0.23 ab	7.99 ± 0.98 bc
	T3 13.55 ± 1.68 a	19.74 ± 3.32 a	2.34 ± 0.47 a	5.42 ± 0.56 ab	1.16 ± 0.23 a	6.29 ± 1.42 ab
	T4 7.15 ± 0.16 a	20.78 ± 2.83 ab	2.11 ± 0.16 a	6.60 ± 0.56 b	1.42 ± 0.22 ab	6.57 ± 0.90 ab
	T5 7.20 ± 0.36 a	28.02 ± 1.77 bc	2.92 ± 0.13 a	8.11 ± 0.50 c	4.49 ± 0.49 c	4.44 ± 0.14 a
	T6 24.86 ± 5.92 b	32.73 ± 2.48 c	3.30 ± 0.39 a	5.25 ± 0.47 ab	2.13 ± 0.29 b	11.53 ± 1.79 d
Underground	T1 23.53 ± 2.20 d	52.70 ± 1.42 b	2.45 ± 0.13 abc	6.51 ± 0.39 ab	1.50 ± 0.17 a	7.34 ± 0.88 b
	T2 23.77 ± 0.74 d	51.41 ± 3.59 b	2.42 ± 0.09 bc	8.61 ± 0.98 bc	1.71 ± 0.10 a	8.32 ± 0.45 b
	T3 16.59 ± 0.71 c	48.40 ± 1.94 b	2.37 ± 0.13 bc	7.84 ± 0.48 abc	1.63 ± 0.09 a	7.33 ± 0.48 b
	T4 12.16 ± 0.85 b	49.10 ± 2.70 b	2.56 ± 0.12 c	9.76 ± 1.27 c	1.88 ± 0.07 a	6.84 ± 0.48 b
	T5 7.16 ± 0.49 a	34.61 ± 1.10 a	1.83 ± 0.10 ab	5.76 ± 0.62 a	4.75 ± 0.28 b	3.56 ± 0.22 a
	T6 21.52 ± 1.75 d	55.77 ± 3.14 b	2.10 ± 0.08 a	6.78 ± 0.74 ab	1.81 ± 0.21 a	7.32 ± 0.27 b

Note, Data are shown in mean ± SE (standard error); Different letters indicate the significant differences with  $p < 0.05$ .