

Electronic Supplementary Material

**Carbon nanofibers as a micronutrient carrier in plants: efficient translocation
and controlled release of Cu nanoparticles**

Mohammad Ashfaq^{a,b}, Nishith Verma^{*a,c} and Suphiya Khan^b

^aCenter for Environmental Science and Engineering, Indian Institute of Technology Kanpur, Kanpur 208016, India.

^bDepartment of Bioscience and Biotechnology, Banasthali University, Banasthali 304022, India.

^cDepartment of Chemical Engineering, Indian Institute of Technology Kanpur, Kanpur 208016, India.

*Corresponding author. Tel.: +91 512 259 7704; fax: +91 512 259 0104. E-mail address:
vermanishith@gmail.com (N. Verma).

Table S1. Comparison of different nanomaterials on the plants growth.

S.no.	Nanomaterials	Concentration (µg/mL)	plant	shoot (S) and root (R) length (cm)	ref
1.	Cu-CNFs	10-500	<i>Cicer aeritinum</i>	~16.7 (S) and 10.6(R)	This study
2.	MWCNTs	23-46	Mustard	~4.8 (S) and 1.8(R)	7
3.	OMWCNTs	2.3-6.9	Mustard	~4.5 (S) and 3.6(R)	7
4.	CuO	500	Wheat	~16 (S) and 4 (R)	8
5.	Bulk CuO	500	Wheat	~18 (S) and 4.5 (R)	8
6.	ZnO	500	Wheat	~17 (S) and 3.6 (R)	8
7.	Bulk ZnO	500	Wheat	~18 (S) and 4 (R)	8
8.	ZnO NPs	1-2000	<i>Vigna radiate</i>	~2 (S) and 6 (R)	11
9.	ZnO NPs	10-2000	<i>Cicer aeritinum</i>	~7.5 (S) and 8.5(R)	11
10.	WsCNTs	3 and 6	<i>Cicer aeritinum</i>	~11 (S) and 9 (R)	13
11.	Ws-Q-dots	150	Wheat	~10 (S) and 9 (R)	16
12.	MWCNTs	20-2000	Cucumber	~3 (S) and 5 (R)	19
13.	MWCNTs	20-2000	Rice	~3 (S) and 5 (R)	19
14.	MWCNTs	20-2000	Lettuce	~2 (S) and 9 (R)	19
15.	MWCNT	20-2000	Red spinach	~4 (S) and 3 (R)	19
16.	CuSO ₄	50-100	<i>Brassica napus</i>	~9 (S) and 3 (R)	28
17.	Cu-EDTA	50-100	<i>Brassica napus</i>	~15 (S) and 5 (R)	28
18.	CuCl ₂	63.5×10 ⁻⁵ – 0.635	Sudangrass	~12 (S) and 16 (R)	29
19.	Cu-EDTA	6.35×10 ⁻³ + 58.4	Sudangrass	~13 (S) and 18 (R)	29
20.	Amberlite (Cu-ion exchange resin)	1.27×10 ⁻³	Rhodes grass	~12 (S) and 5 (R)	41
21.	Cu-rosin acids	1000-2000	Tomato	~19 (S+R) and 17 (S+R)	42
22.	Cu-oxychloride	1000-2000	Tomato	~22 (S+R) and 19 (S+R)	42
23.	CuSO ₄	13.4-51.1	<i>Brassia juncea</i>	~13.4 (S)	43