Electronic Supplementary Material (ESI) for Environmental Science: Nano.

Supplementary Material

Preventing viral disease by ZnONPs through directly deactivating TMV and activating the plant immunity in *Nicotiana benthamiana*

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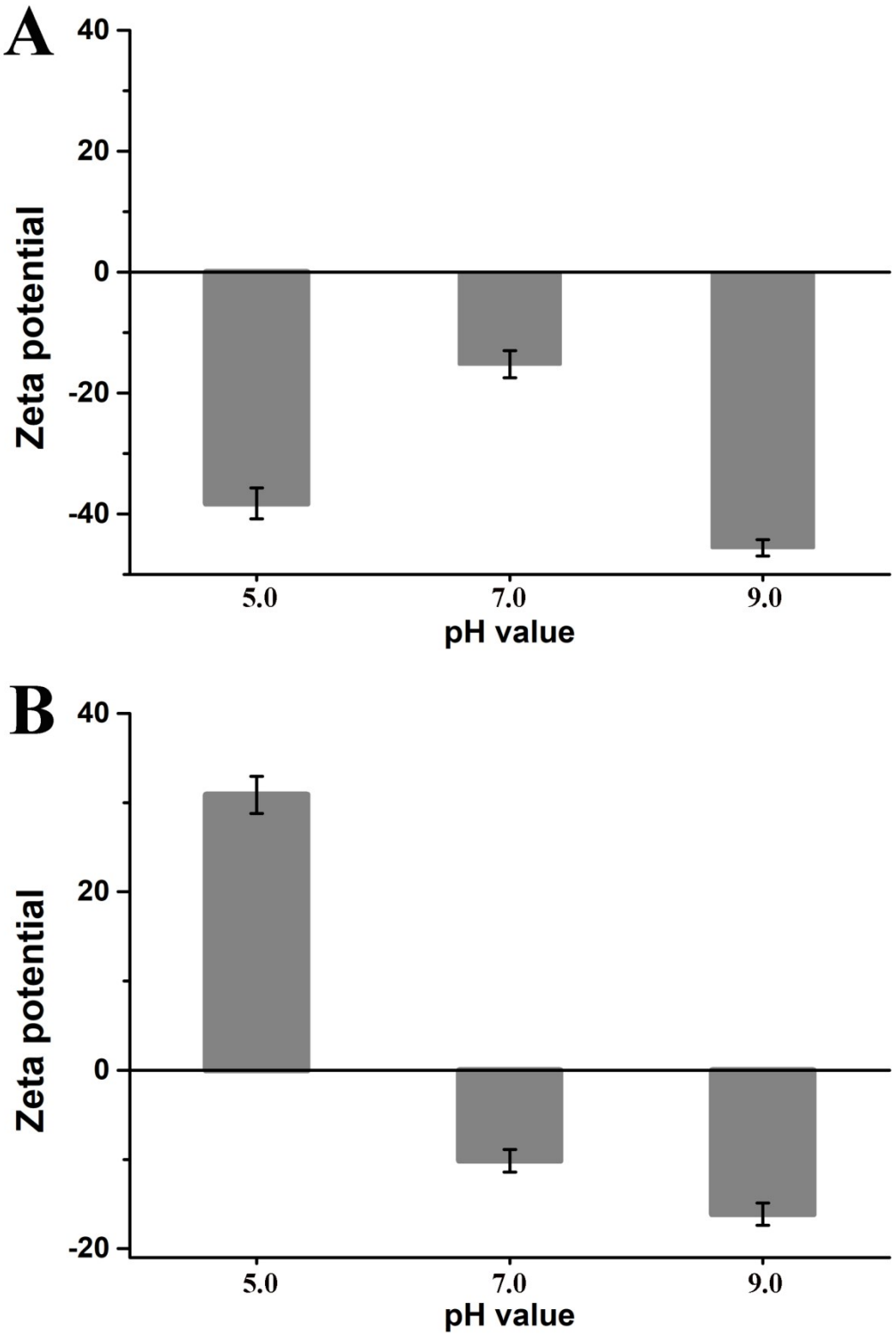

Figure ES1 Zeta potential of (A) ZnONPs and (B) SiO_2NPs dispersed in deionized water. The pH values range from 5.0 to 9.0.

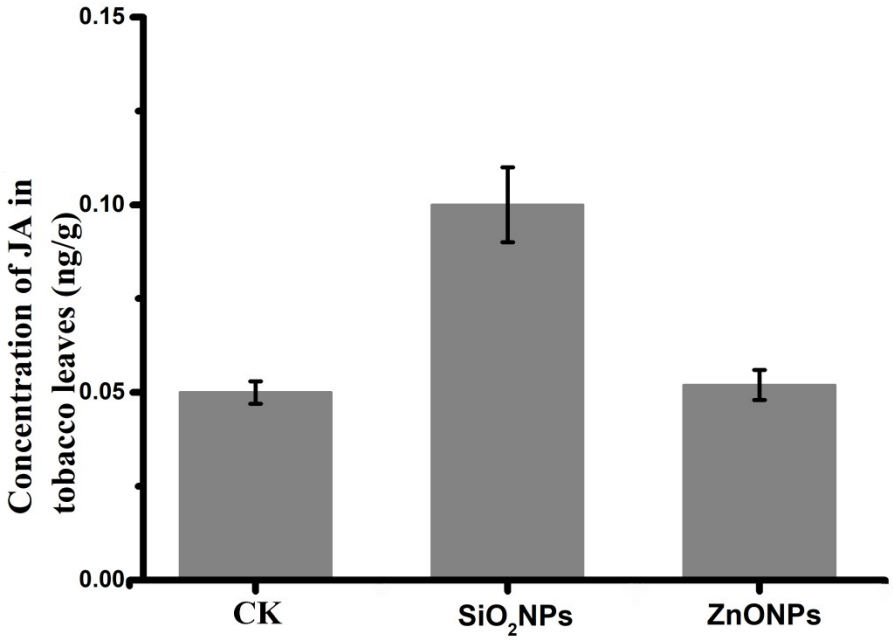

Figure ES2 Effects of the ZnONPs or SiO_2NPs on JA concentration in the leaves of tobacco plants.

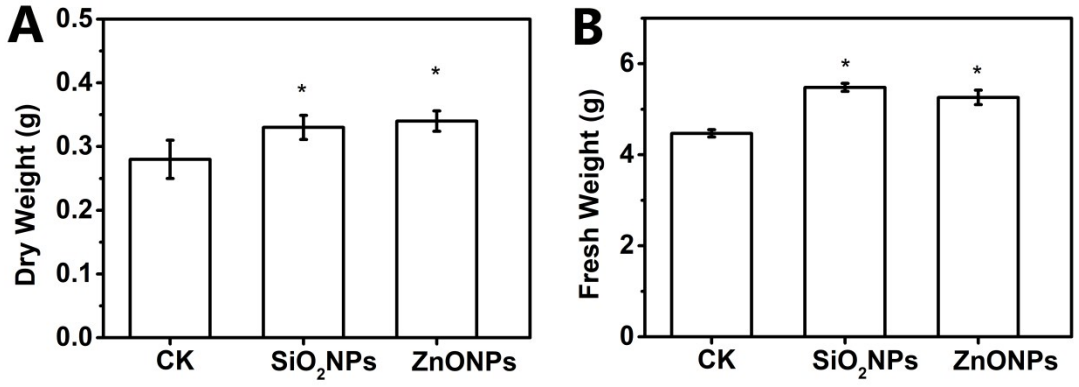

Figure ES3 Total dry weight, and fresh weight (at maturity) of tobacco after foliar treatment with SiO_2NPs and ZnONPs at 100 μg/mL; bars with different letters indicate significant differences with $P < 0.05$

Table ES1 Primer sequences used for RT-qPCR

Gene	Forward	Reverse
actin	CTTGAAACAGCAAAGACCAGC	CATCCTATCAGCAATGCCCG
PR1	ATGGTCAATACGGCGAAAAC	CCTAGCACATCCAACACGAA
PR2	CAACCCGCCCAAAGATAGTA	TCCAAAAGGGCATCAAAAAG

Table ES2 DLS measurements of NPs and TMV in deionized water

	Size ± SD (nm)
TMV	62.35±3.67
ZnONPs	55.72±5.12
SiO2NPs	118.38±12.02
TMV +ZnONPs	112.79±4.57
TMV + SiO2NPs	98.01±10.31

Table ES3 pH value of different materials in deionized water

Solution	pH value
Deionized water	7.01
Bulk SiO_2 in deionized water	6.92
SiO_2NPs in deionized water	7.00
LNT in deionized water	6.70
Bulk ZnO in deionized water	7.06
ZnONPs in deionized water	7.35