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

SUPPORTING INFORMATION

Topologically Zn^{2+} hybridized ZnS nanospheres (Zn^{2+}/ nZnS) efficiently restrained the infection of *Fusarium verticillioides* in rice seeds by hyphal disorganization and nutritional modulation

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Supporting table S1. Accuracy and precision of the ICP-OES method

Zn added (µg/ml)	Zn found (µg/ml) (mean± s.d)	Relative Recovery (%)	Relative Standard Deviation (%)
0.50	0.48 ± 0.01	96.00	2.08
1.00	0.97 ± 0.04	97.00	4.12
2.00	1.94 ± 0.11	97.00	5.67
5.00	4.83±0.27	96.60	5.59
10.00	9.41±0.66	94.10	7.01

Supporting figures:

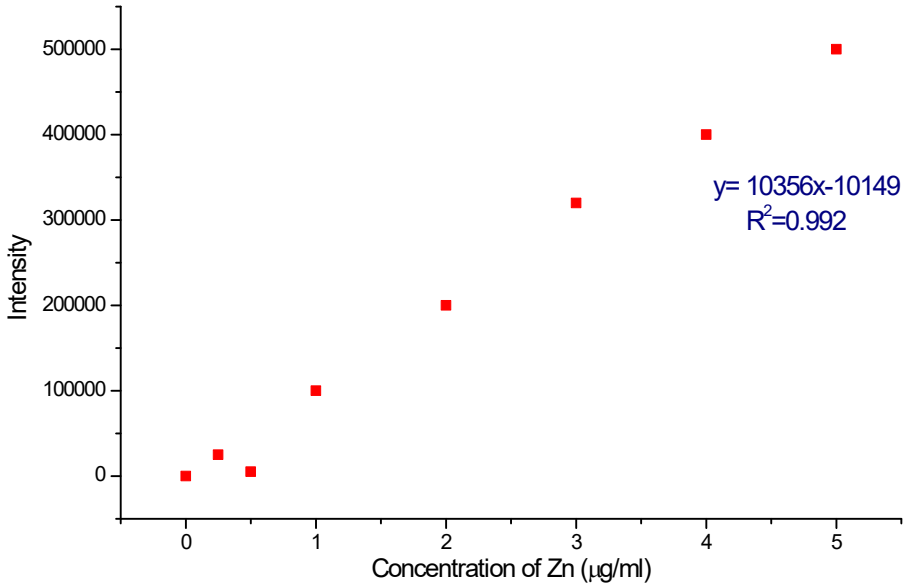


Figure S1. Linearity relationship between concentration of Zn and intensity of light emitted at wavelengths of 213.857 nm by using ICP-OES method

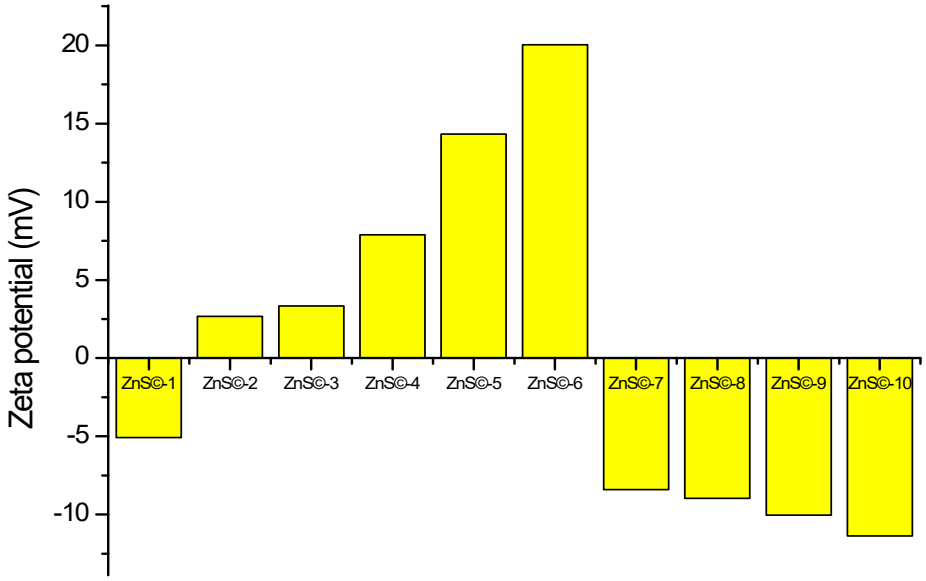
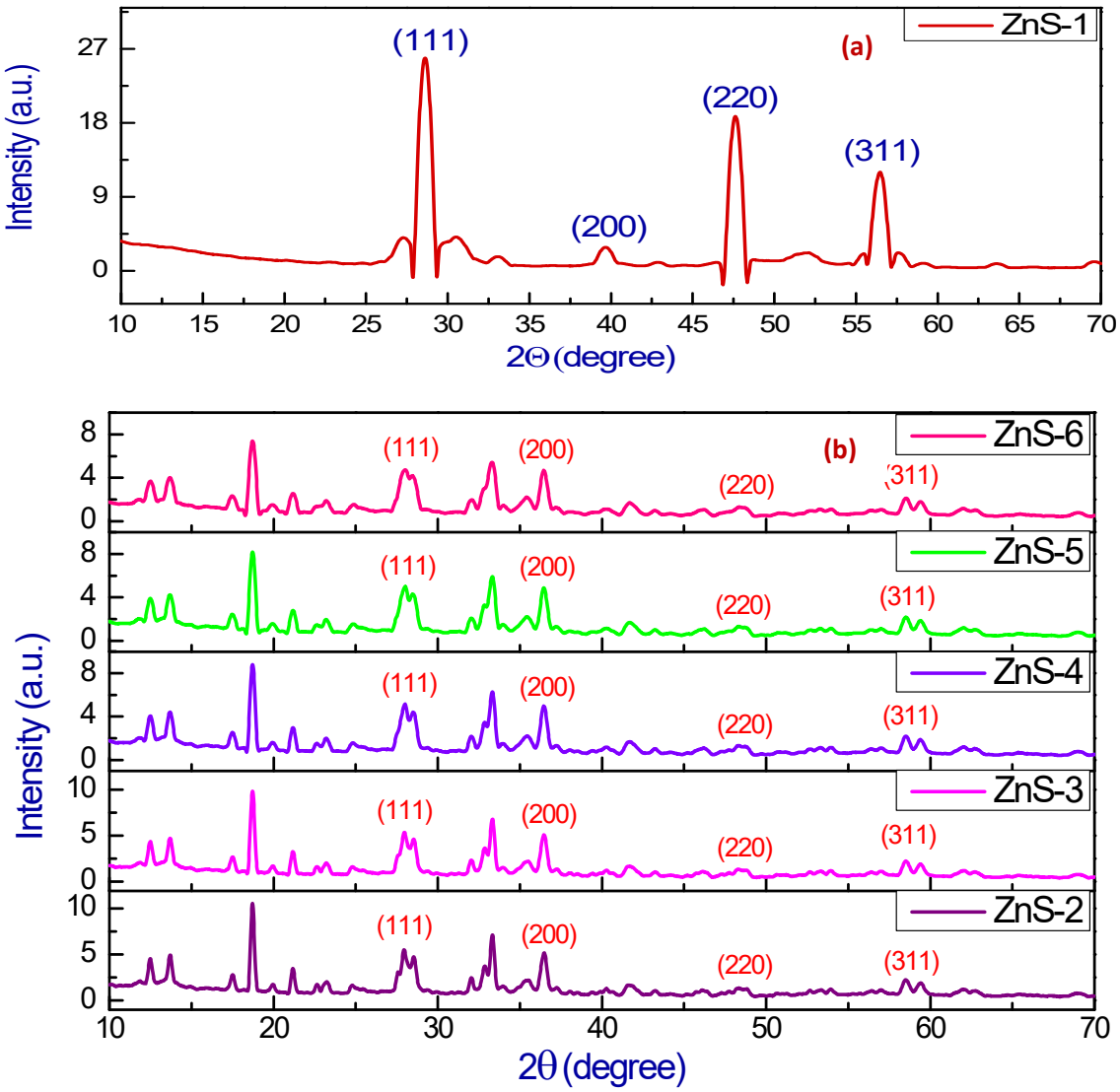


Figure S2. Comparative average zeta potential value of uncoated (ZnS©-1), Zn^{2+}/nZnS (ZnS©-2 to ZnS©-6) and S^{2-}/nZnS (ZnS©-7 to ZnS©-10)


ZnS-1
(a)
(111)
(200)
(220)
(311)
Intensity (a.u.)
2Θ (degree)
ZnS-6
ZnS-5
ZnS-4
ZnS-3
ZnS-2
(b)
2θ (degree)

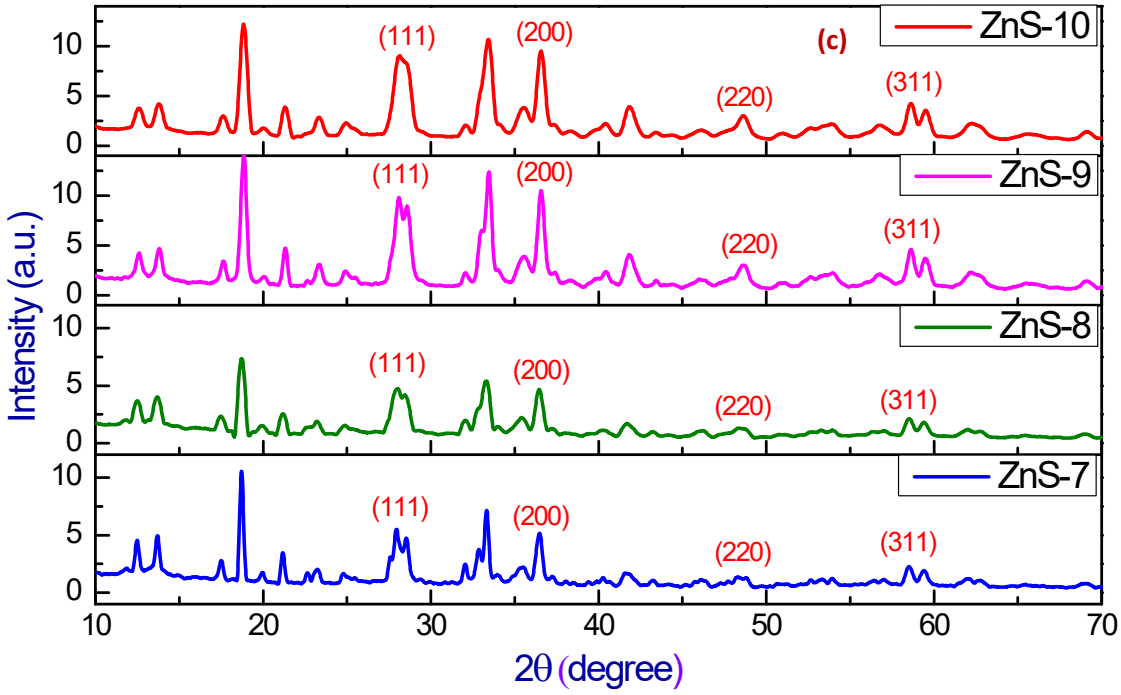


Figure S3. X-ray diffraction pattern of (a) uncoated (ZnS©-1), (b) Zn^{2+}/nZnS (ZnS©-2 to ZnS©-6) and (c) S^{2-}/nZnS (ZnS©-7 to ZnS©-10)

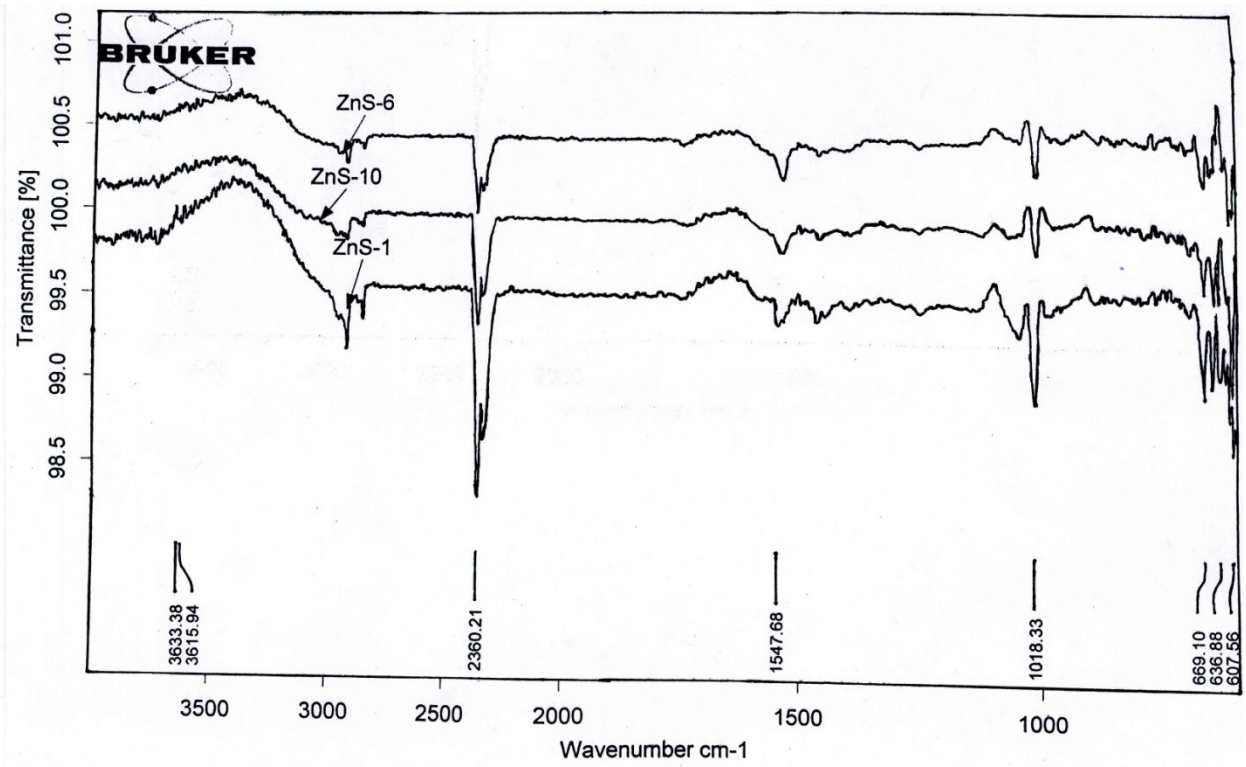


Figure S4. FT-IR spectrum of (a) uncoated ZnS NPs (ZnS©-1) (b) Zn^{2+}/nZnS (ZnS©-6) (c) S^{2-}/nZnS (ZnS©-10)

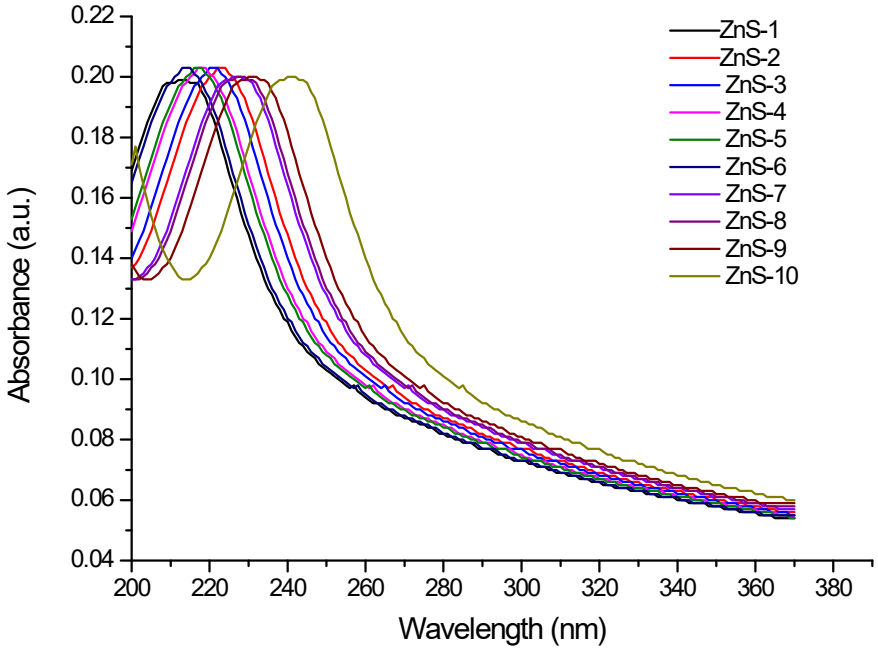


Figure S5. UV-visible spectrum of differentially surface charged ZnS NPs (ZnS©-1 to ZnS©-10)

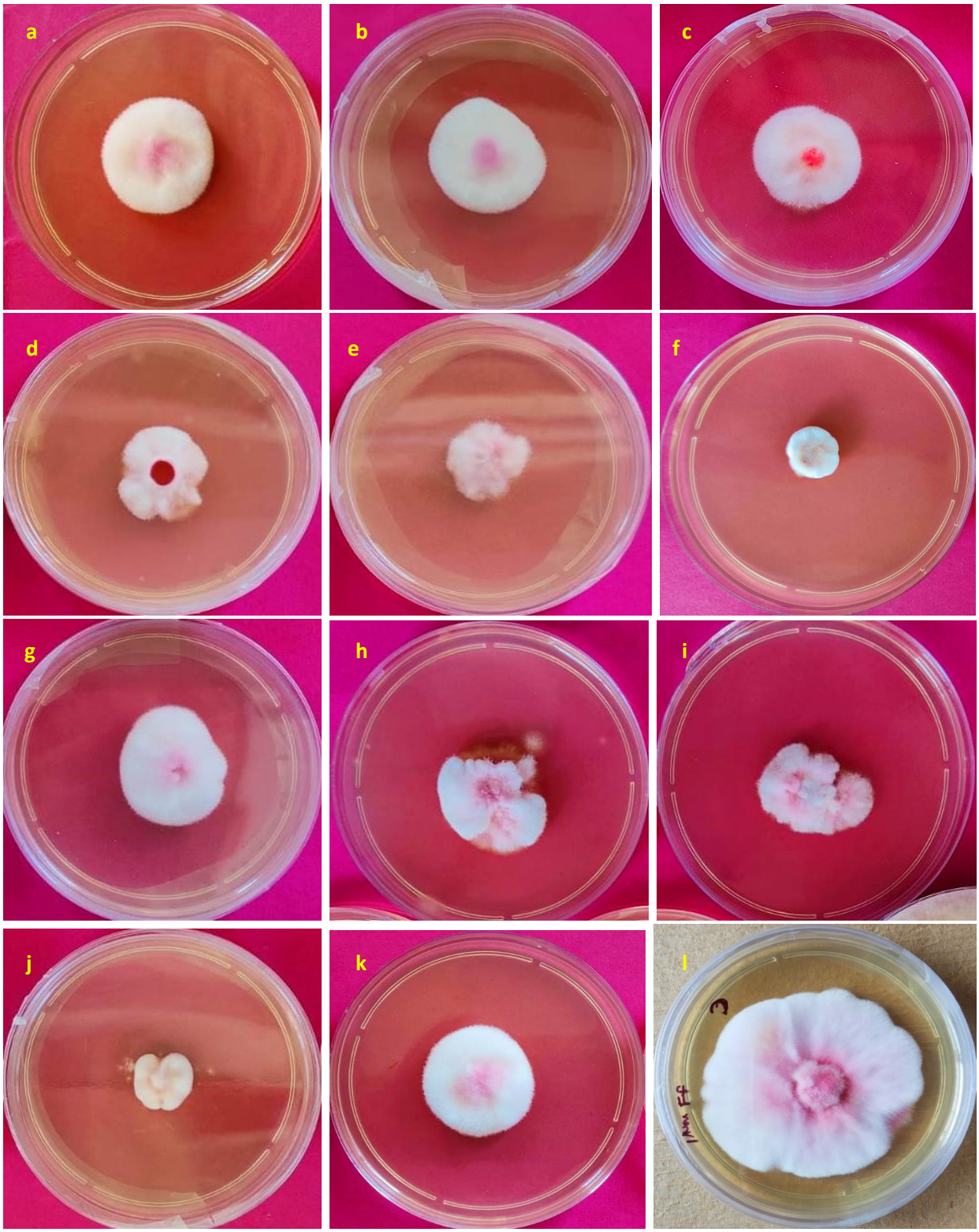


Figure S6. Antifungal evaluation of (a) ZnS©-1 at 40µg/ml, (b) ZnS©-2 at 40µg/ml, (c) ZnS©-3 at 40µg/ml, (d) ZnS©-4 at 40µg/ml, (e) ZnS©-5 at 40µg/ml, (f) ZnS©-6 at 40µg/ml, (g) ZnS©-7 at 40µg/ml, (h) ZnS©-8 at 40µg/ml, (i) ZnS©-9 at 40µg/ml, (j) ZnS©-10 at 40µg/ml, (k) carbendazim at 250 µg/ml and (l) untreated (control) against mycelium growth of *F. verticillioides.*

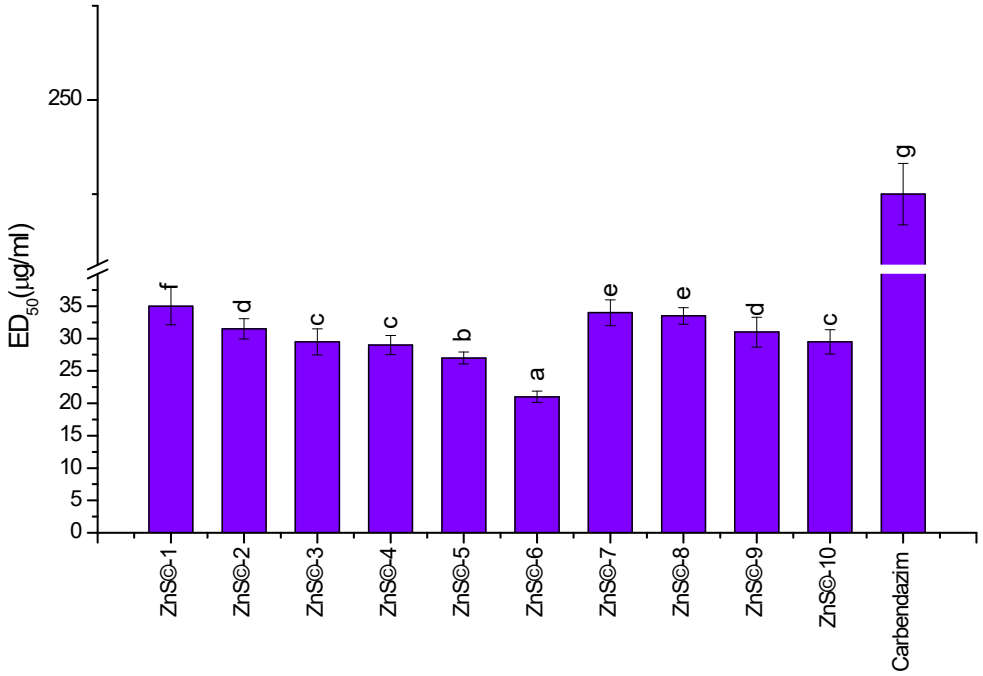


Figure S7. ED_{50} (µg/ml) values of surface charged ZnS NPs and carbendazim (standard) against *F.verticillioides*

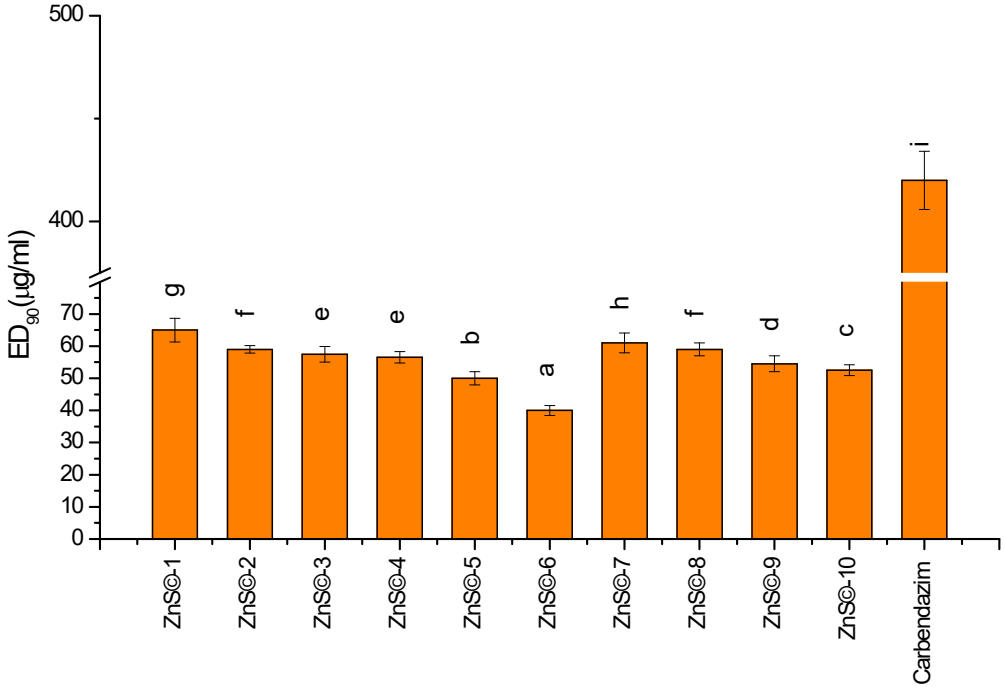


Figure S8. ED_{90} (µg/ml) values of surface charged ZnS NPs and carbendazim (standard) against *F.verticillioides*

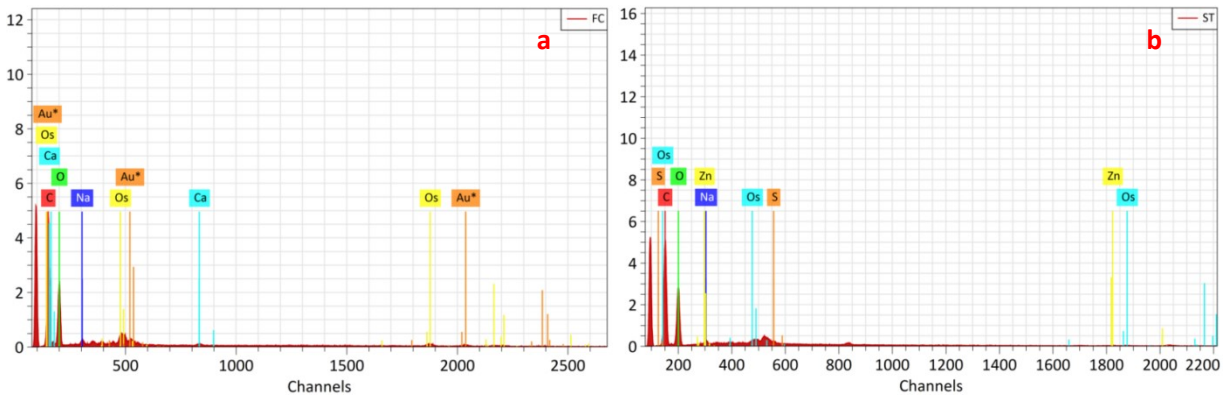


Figure S9. EDS spectum represents the qualitative elemental analysis of the ZnS©-6 NPs on hyphal surface. (a) Control (untreated) and (b) ZnS©-6 treated *F. verticillioides*

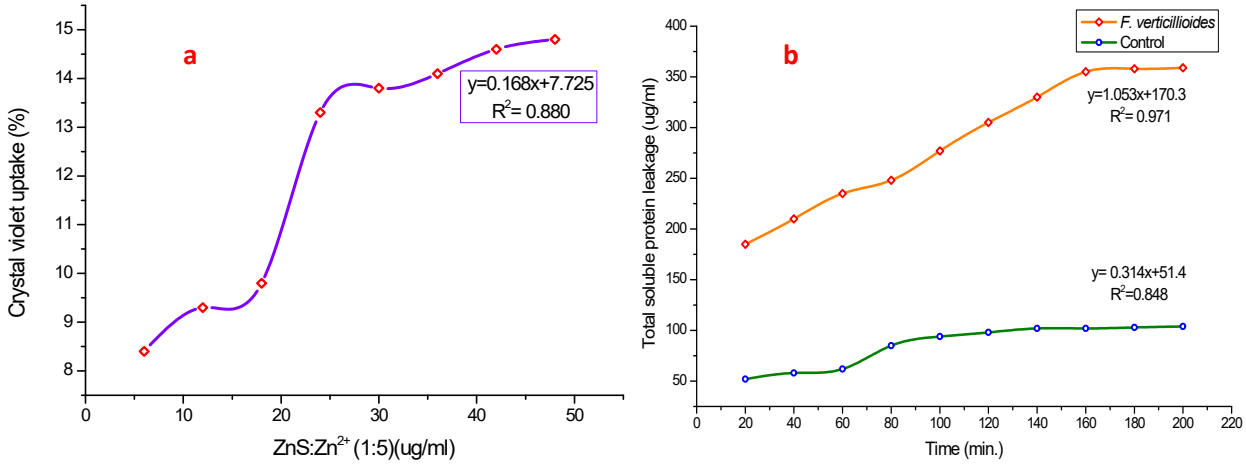


Figure S10. (a) Crystal violet uptake of ZnS©-6 treated ruptured *F.verticillioides* hyphae, (b) Intracellular soluble protein leakage from ZnS©-6 treated damaged *F.verticillioides* hyphae

Figure S11. Relative seed health and quality parametes of rice seeds nanoprimed with (a) ZnS©-1 at 48µg/ml (b) ZnS©-6 at 48µg/ml, (c) zinc acetate at 48µg/ml, (d) hydroprimed(Control) and (e) carbendazim at 2000µg/ml

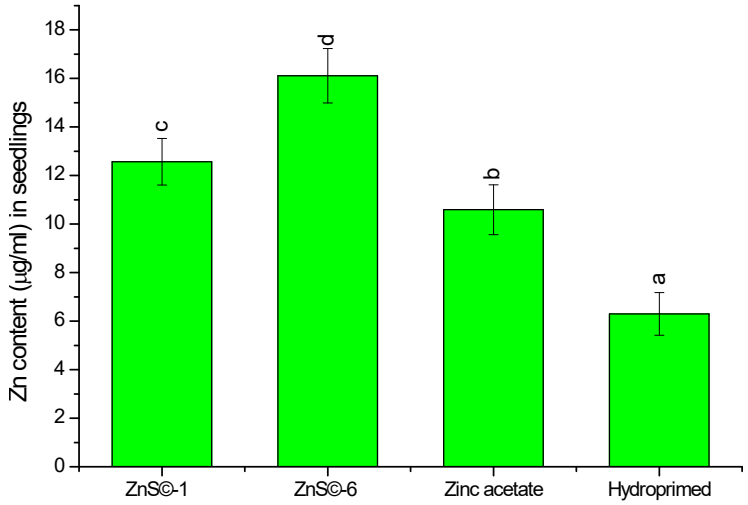


Figure S12. Analysis of nutritional Zn (µg/ml) content in rice seedlings by ICP-OES