Supplementary Data

Impact of titanium dioxide nanoparticles on Cd phytotoxicity and bioaccumulation in rice (*Oryza sativa* L.)

Table S1. Basic physicochemical properties of paddy soils.

Test Items	Paddy Soil
pH	6.2 ± 0.1
Organic matter (%)	2.5 ± 0.1
Sand fraction (%)	14 ± 0.9
Silt fraction (%)	56 ± 0.5
Clay fraction (%)	31 ± 0.4
Cation exchange capacity (cmol kg^{-1})	8.5 ± 0.1
Total N (g kg^{-1})	2.3 ± 0.7
Total P (g kg^{-1})	0.5 ± 0.1
Total K (g kg^{-1})	12 ± 3.7
Total Fe (g kg^{-1})	9.4 ± 0.7
Total Mn (mg kg^{-1})	93 ± 8.1
Total Cu (mg kg^{-1})	23 ± 3.2
Total Zn (mg kg^{-1})	56.74 ± 3.19
Total Cd (mg kg^{-1})	0.20 ± 0.04

Table S2. Plant height during various growth stages (cm).

Treatment	Tillering Stage			Booting Stage			Heading Stage		
	C1 Group	C2 Group	C3 Group	C1 Group	C2 Group	C3 Group	C1 Group	C2 Group	C3 Group
T0	35 ± 1.1 b	31 ± 1.2 b	31 ± 1.1 c	63 ± 0.5 ab	62 ± 0.8 b	62 ± 0.6 b	76 ± 3.3 b	78 ± 3.1 a	75 ± 4.9 a
T1	43 ± 0.2 a	42 ± 2.2 a	34 ± 0.9 b	65 ± 0.8 ab	65 ± 2.2 a	62 ± 3.5 ab	82 ± 1.0 a	78 ± 4.4 a	75 ± 4.1 a
T2	38 ± 1.5 b	43 ± 2.2 a	34 ± 0.7 b	63 ± 2.0 b	64 ± 3.2 ab	65 ± 1.9 a	77 ± 2.9 b	77 ± 8.1 a	77 ± 5.3 a
T3	44 ± 0.7 a	42 ± 1.6 a	38 ± 0.8 a	67 ± 0.2 a	65 ± 1.3 a	62 ± 0.8 b	83 ± 2.3 a	77 ± 4.6 a	76 ± 7.6 a

Note: Different letters represent significant differences between various treatments in same group ($p < 0.05$, LSD), $n = 3$.

Table S3. The impact of TiO_2 NPs on plant biomass (g).

Treatment	Root Biomass			Shoot Biomass			Ear Biomass			Total Biomass		
	C1 Group	C2 Group	C3 Group	C1 Group	C2 Group	C3 Group	C1 Group	C2 Group	C3 Group	C1 Group	C2 Group	C3 Group
T0	4.3 ± 0.4 a	3.4 ± 0.4 b	3.2 ± 0.3 a	14 ± 0.7 a	12 ± 0.6 a	11 ± 0.9 b	10 ± 0.7 b	9.6 ± 0.6 a	7.0 ± 0.9 a	28 ± 1.2 b	25 ± 0.4 ab	22 ± 0.7 c
T1	3.9 ± 0.1 a	4.3 ± 0.2 a	3.4 ± 0.7 a	13 ± 1.0 a	13 ± 1.0 a	11 ± 0.6 b	11 ± 0.9 b	10 ± 1.0 a	8.3 ± 0.9 bc	28 ± 0.2 b	28 ± 1.9 a	22 ± 2.0 bc
T2	3.5 ± 0.5 a	3.8 ± 0.1 ab	3.6 ± 0.6 a	12 ± 0.9 b	12 ± 1.7 a	14 ± 0.9 a	11 ± 0.9 b	9.9 ± 0.7 a	12 ± 0.5 a	26 ± 1.9 b	26 ± 1.8 ab	29 ± 1.7 a
T3	4.2 ± 047 a	3.6 ± 0.3 ab	3.6 ± 0.3 a	14 ± 0.9 a	14 ± 0.9 a	12 ± 0.5 b	13 ± 0.9 a	8.9 ± 0.8 a	9.4 ± 0.7 b	31 ± 2.2 a	24 ± 1.5 b	25 ± 0.5 b

Note: Different letters represent significant differences between various treatments in same group ($p < 0.05$, LSD), $n = 3$.

Table S4. Total chlorophyll content in the leaves of *Oryza saliva* L. (mg kg^{-1}).

Treatment	Tillering Stage			Booting Stage			Heading Stage		
	C1 Group	C2 Group	C3 Group	C1 Group	C2 Group	C3 Group	C1 Group	C2 Group	C3 Group
T0	4.2 ± 0.1 a	4.5 ± 0.1 a	4.4 ± 0.1 a	3.8 ± 0.1 a	4.0 ± 0.2 a	4.3 ± 0.1 a	3.1 ± 0.1 a	3.1 ± 0.1 a	3.1 ± 0.2 a
T1	4.6 ± 0.1 b	4.7 ± 0.1 ab	4.6 ± 0.1 b	3.9 ± 0.1 a	4.1 ± 0.1 a	4.1 ± 0.2 a	3.1 ± 0.2 a	3.0 ± 0.3 a	3.1 ± 0.1 a
T2	4.5 ± 0.1 b	4.9 ± 0.1 bc	4.5 ± 0.1 ab	4.0 ± 0.1 a	4.1 ± 0.2 a	4.1 ± 0.1 a	3.0 ± 0.1 a	3.1 ± 0.1 a	3.0 ± 0.2 a
T3	5.1 ± 0.1 c	5.0 ± 0.1 c	4.7 ± 0.1 b	3.9 ± 0.2 a	3.9 ± 0.1 a	4.1 ± 0.2 a	3.1 ± 0.2 a	3.0 ± 0.2 a	3.1 ± 0.2 a

Note: Different letters represent significant differences between various treatments in same group ($p < 0.05$, LSD), n = 3.

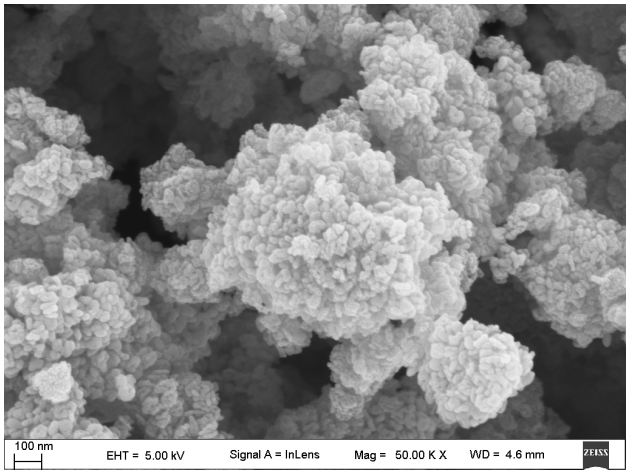

Figure S1. Scanning electron microscope image of TiO_2 NPs.

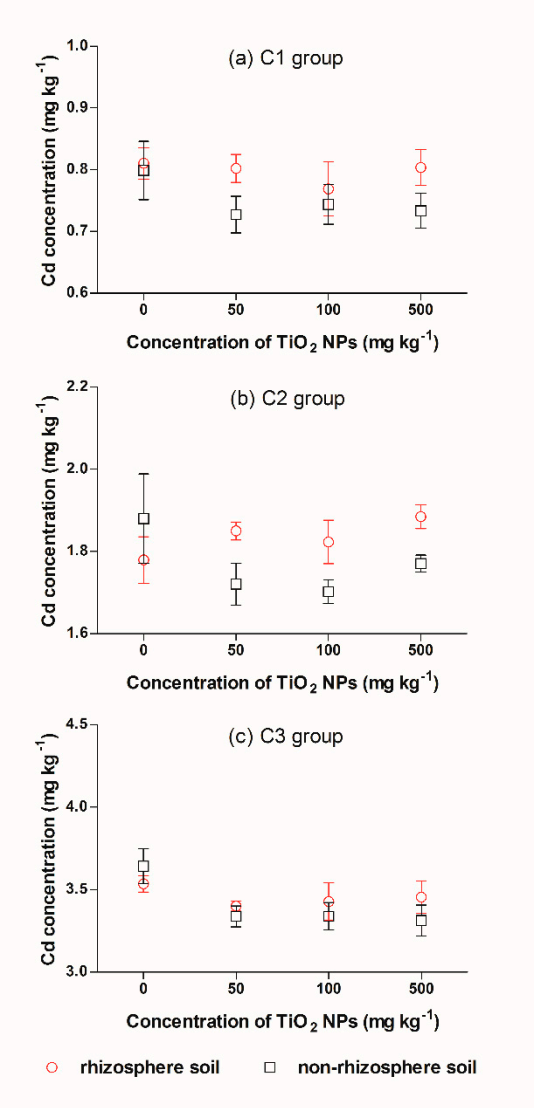

Figure S2. Bioavailable Cd content in rhizosphere/non-rhizosphere soil. (**a**) C1 group, (**b**) C2 group, (**c**) C3 group.