Electronic Supplementary Information

Toxicity and tolerance mechanism of binary zinc oxide nanoparticles and tetrabromobisphenol A regulated by humic acid in *Chlorella vulgaris*†

Yi Liu,‡[a] Mengen Kang,‡[a] Yuzhu Weng,[a] Yuanyuan Ding,[a] Xue Bai[a,b,*]

[a] Key Laboratory of Integrated Regulation and Resource Development on Shallow Lake of Ministry of Education, College of Environment, Hohai University, Nanjing 210098, China

[b] Yangtze Institute for Conservation and Development, Hohai University, Nanjing 210098, China

*Corresponding author: Xue Bai;

Address: Xikang Road No.1, Gulou District, Nanjing, China, 210098 (College of Environment, Hohai University, Nanjing);

Email：baixue@hhu.edu.cn

† Electronic supplementary information (ESI) available.

‡ Y. Liu and M. Kang contributed equally to this work.

Text S1 Characterization of pristine zinc oxide nanoparticles (ZnO NPs)

Based on the scanning electron microscopy (SEM) image (Fig. S1a), the pristine ZnO NPs had a slightly regular spherical morphology with uniformly dispersed particles in the range of 20–40 nm in size. In contrast, Transmission electron microscopy (TEM) images (Fig. S1b) revealed that ZnO NPs were aggregated into irregular shapes in the algae culture medium. Additionally, XRD (Fig. S1c) showed that the presence of peaks at 2 θ = 1.74°, 34.49° and 36.38° respectively corresponded to the (100), (002) and (101) diffraction planes of the hexagonal wurtzite structure (JCPDS file No. 36–1451) belonging to $P6_3mc$ space group.

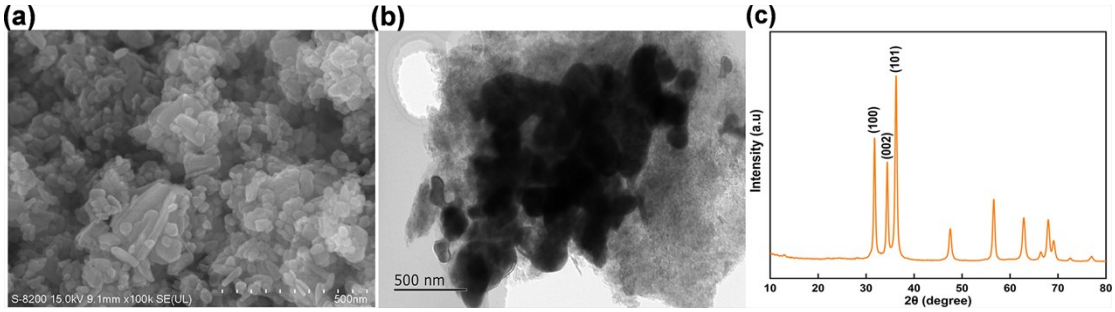

Fig. S1 The characterization of ZnO NPs. SEM image of pristine ZnO NPs (**a**), TEM image of ZnO NPs in the culture with algae (**b**), and XRD patterns of pristine ZnO NPs **(c)**.

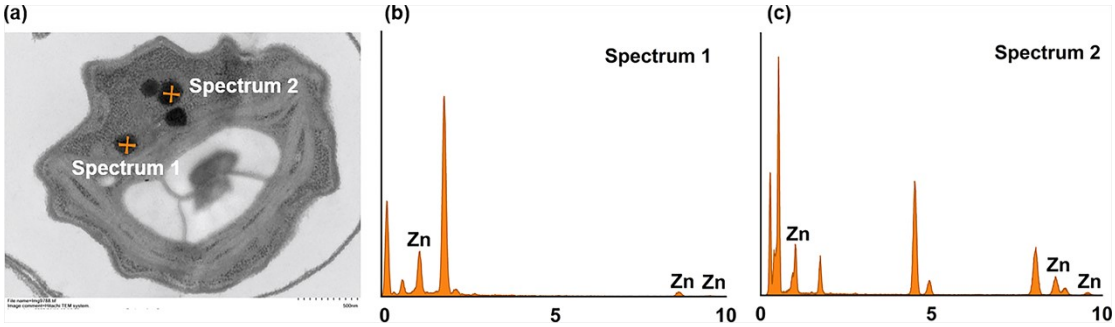

Fig. S2 Bio-TEM and EDS of dense aggregates in the ZnO-TBBPA (8) treatment.

16 **Table S1** The medium of BG-11 culture.

Macronutrient	Concentrations (g/L)	Macronutrient	Concentrations (g/L)
$NaNO_3$	1.5	H_3BO_3	2.86
$MgSO_4 \cdot 7H_2O$	0.037	$MnCl_2 \cdot 4H_2O$	1.81
$CaCl_2 \cdot 7H_2O$	0.036	$ZnSO_4 \cdot 7H_2O$	0.22
$K_2HPO_4 \cdot 5H_2O$	0.054	$CuSO_4 \cdot 5H_2O$	0.0079
$NaCO_3$	0.054	$Na_2MO_4 \cdot 2H_2O$	0.0009
$Co(NO_3)_2 \cdot 2H_2O$	0.0094	Na_2EDTA	0.01
Ammonium ferric citrate	0.006	Citric acid	0.006

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