

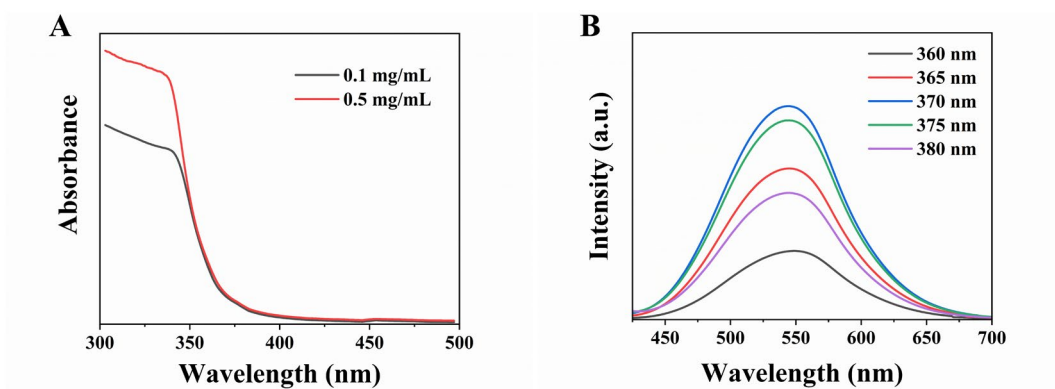
## **Supporting Information**

# **pH-Responsive Pesticide-Loaded Hollow Mesoporous Silica Nanoparticles with ZnO Quantum Dots as a Gatekeeper for Control of Rice Blast Disease**

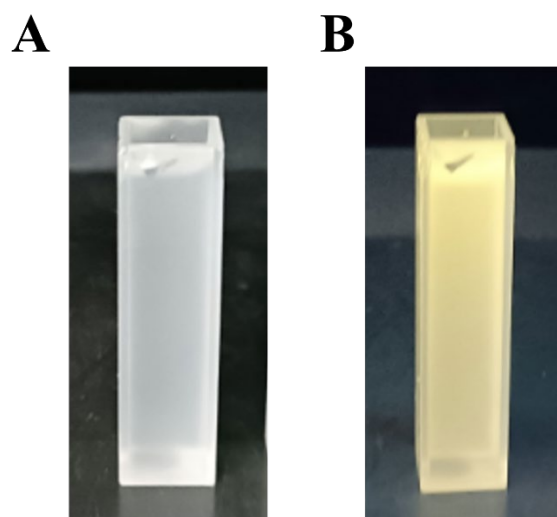
Yi Zhao, Yanning Zhang, Yilin Yan, Zunyao Huang, Yuting Zhang, Xiaoli Wang\* and Nandi Zhou\*

The Key Laboratory of Carbohydrate Chemistry and Biotechnology, Ministry of Education, School of Biotechnology, Jiangnan University, Wuxi 214122, China

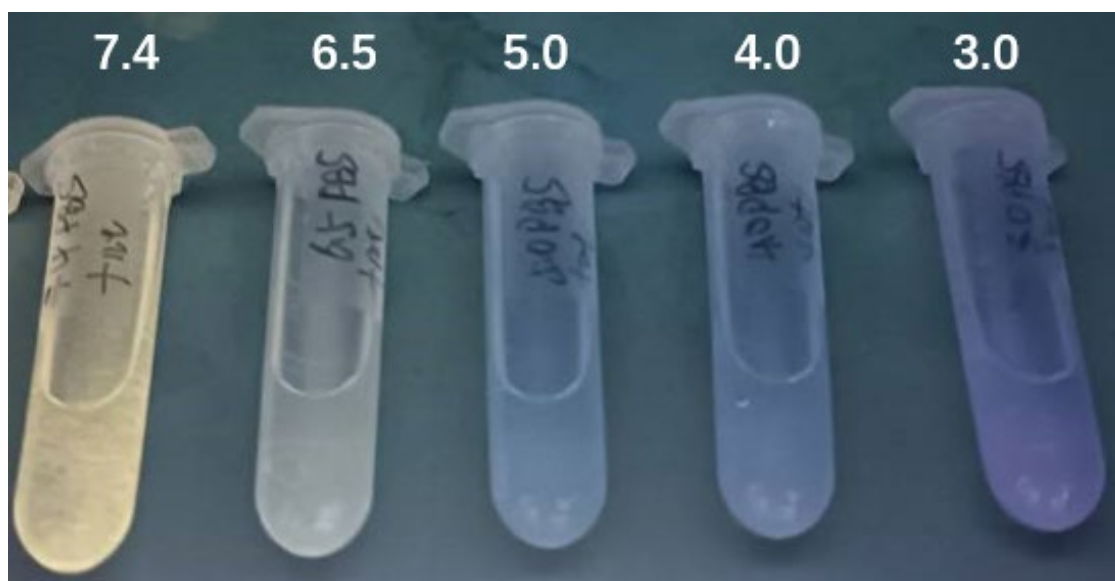
\*Corresponding authors. E-mail addresses: [xiaoliwang@jiangnan.edu.cn](mailto:xiaoliwang@jiangnan.edu.cn) (X. Wang); [zhounandi@jiangnan.edu.cn](mailto:zhounandi@jiangnan.edu.cn) (N. Zhou)



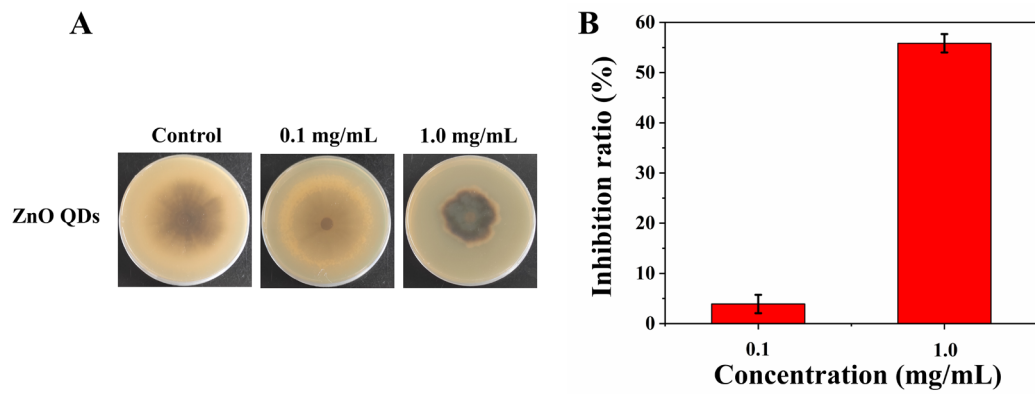
**Figure S1.** (A) UV-vis absorption spectra of ZnO QDs at different concentrations. (B) Fluorescence spectra of ZnO QDs at different excitation wavelength.



**Figure S2.** Digital images of ZnO QDs under daylight (A) and 365 nm UV lamp (B).



**Figure S3.** Dissolution of ZnO QDs in PBS at different pH.



**Figure S4.** (A) Images of *M. oryzae* treated with different concentration of ZnO QDs for 13 days. (B) Inhibition ratio of *M. oryzae* treated with different concentration of ZnO QDs for 13 days.

**Table S1.** Release kinetic equations of HMSNs@Pro at different pH.

pH	Models	Fitting equation	R <sup>2</sup>
5.0	Zero-order	$y=1.20\ x +21.68$	0.5957
	Higuchi	$y=10.35\ x^{1/2}+6.33$	0.8755
	Ritger-Peppas	$y=17.93\ x^{0.36}$	0.9237
6.5	Zero-order	$y=1.31\ x +22.61$	0.6077
	Higuchi	$y=11.25\ x^{1/2}+6.05$	0.9151
	Ritger-Peppas	$y=18.59\ x^{0.37}$	0.9237
7.4	Zero-order	$y=0.90\ x +29.13$	0.3273
	Higuchi	$y=8.74\ x^{1/2}+14.88$	0.6694
	Ritger-Peppas	$y=25.99\ x^{0.25}$	0.8448

**Table S2.** Release kinetic equations of HMSNs@Pro@ZnO QDs at different pH.

pH	Models	Fitting equation	R <sup>2</sup>
5.0	Zero-order	$y=0.93 x +13.63$	0.6756
	Higuchi	$y=7.80 x^{1/2}+2.41$	0.9152
	Ritger-Peppas	$y=10.96 x^{0.41}$	0.9357
6.5	Zero-order	$y=0.64 x +9.13$	0.7424
	Higuchi	$y=5.26 x^{1/2}+1.74$	0.9496
	Ritger-Peppas	$y=7.28 x^{0.42}$	0.9637
7.4	Zero-order	$y=0.27 x +8.68$	0.4102
	Higuchi	$y=2.49 x^{1/2}+4.74$	0.7425
	Ritger-Peppas	$y=7.97 x^{0.23}$	0.9306

**Table S3.** Fungicidal activity of Pro technical and HMSNs@Pro@ZnO QDs against *M. oryzae*.

Group	Regression equation	EC <sub>50</sub>	R <sup>2</sup>	95% Confidence limits
Pro technical	y=2.292+2.171x	0.088	0.987	0.076-0.103
HMSNs@Pro@ZnO QDs	y=2.677+2.339x	0.072	0.979	0.063-0.082



**Table S4.** Effects of Pro technical, HMSNs@Pro@ZnO QDs and 0.1% tween-80 on the lesion development by *M. oryzae* on rice leaves.

Group	Concentration (µg/mL)	Lesion length (cm <sup>2</sup> )	Control efficacy (%)
Pro technical	100	0.454	86.72
HMSNs@Pro@ZnO QDs	100	0.362	89.40
Control	-	3.416	-