Electronic Supporting Information

Kinetics of the photolysis of pyridaben and its main photoproduct in aqueous environments under simulated solar irradiation

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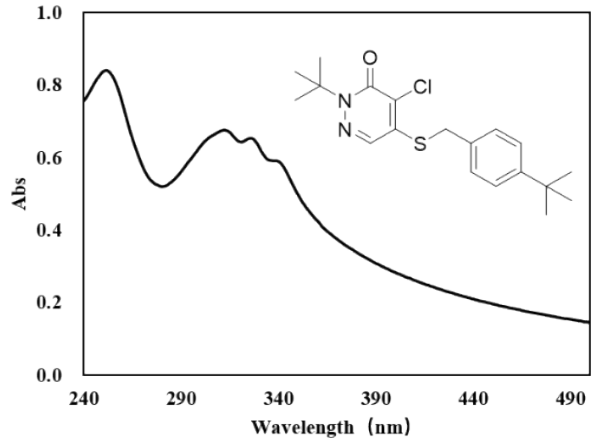

Figure S1 The structural formula of pyridaben and its UV-Vis absorption spectrum in distilled water (20 mg/L).

Table S1 Physicochemical characteristics of water samples.

Water type	pH	Conductivity (μS/cm)	TDS (mg/L)	Salinity (‰)	DOC (mg/L)
Distilled water	5.50	3.63	1.68	0.00	1.069
Tap water	7.34	457.00	231.00	2.40	1.184
Rainwater	6.85	40.20	20.50	0.20	1.446
River water	7.15	482.00	243.00	2.60	1.508
Pond water	7.87	241.00	119.80	1.20	2.257

DOC: Dissolved organic carbon

TDS: Total dissolved solids

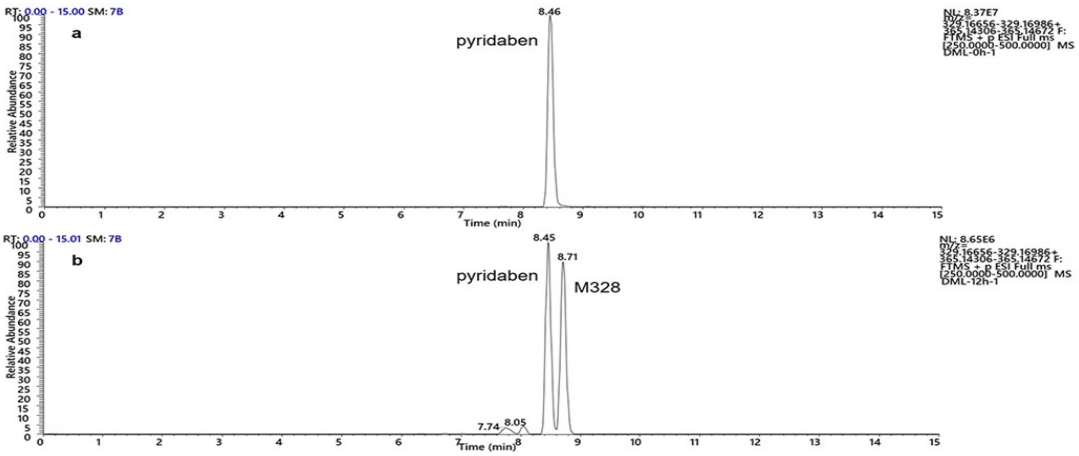

Figure S2 Extracted ion chromatograms of pyridaben before (a) and after 12 h of photolysis (b).

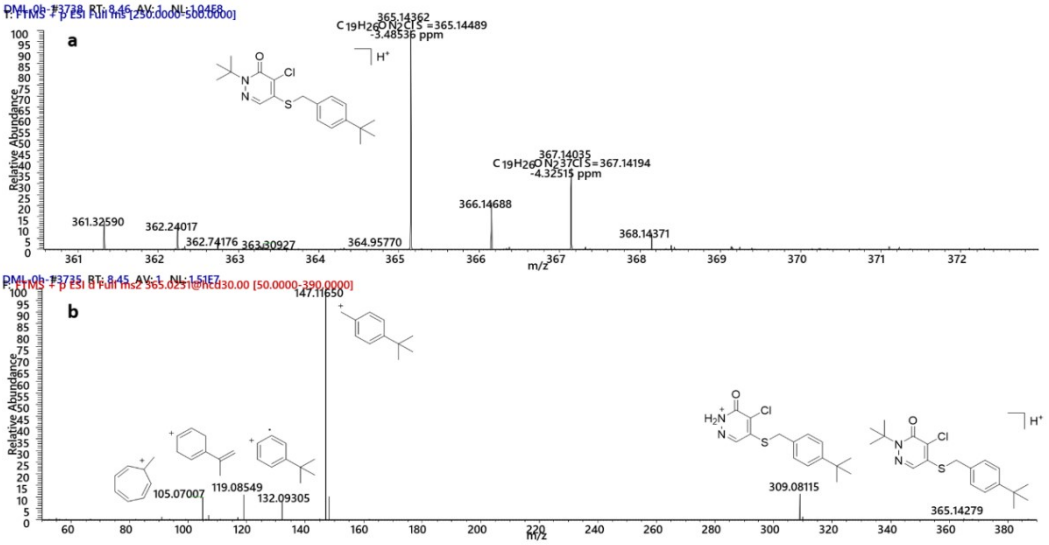

Figure S3 Full mass spectrum (a) and MS^2 fragmentation spectrum (b) of pyridaben.

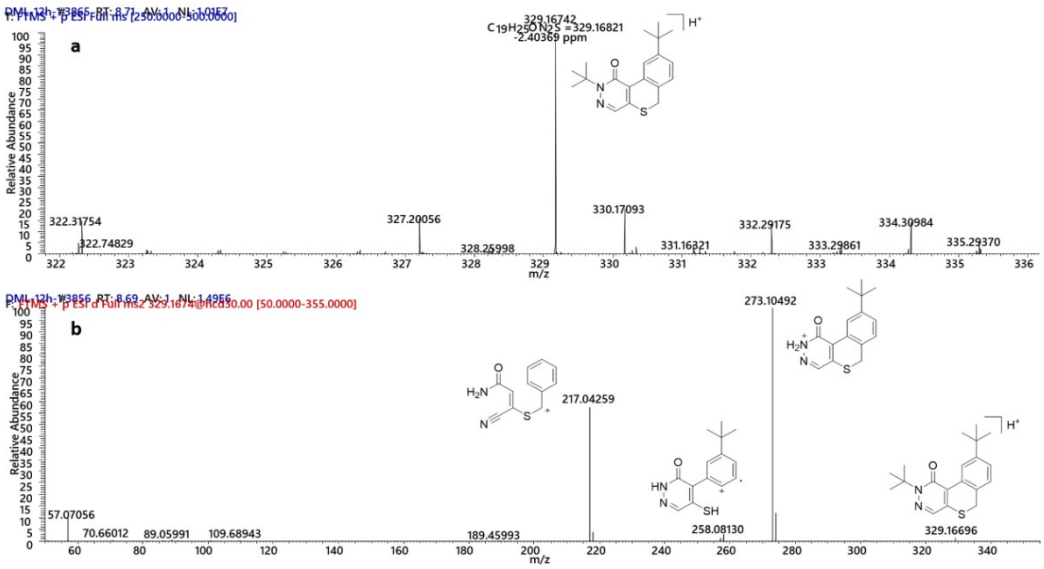

Figure S4 Full mass spectrum (a) and MS^2 fragmentation spectrum (b) of M328.

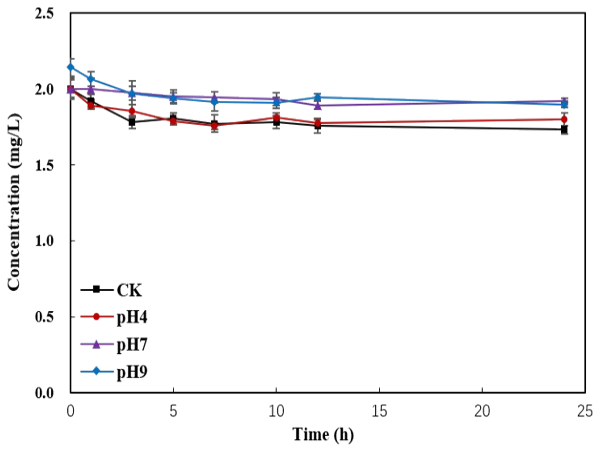

Figure S5 Hydrolysis kinetics of pyridaben in distilled water and buffer solutions (Dark control).

Table S2 Degradation kinetic parameters of pyridaben in the different aqueous solutions.

Impact factors	Value	Kinetic equations	$t_{1/2}$ (h)	*p*
distilled water	/	$C_1 = 1.803e^{-0.294t}$	2.36±0.06	/
		$C_2 = 0.910e^{-0.083(t-3)}$		
pH	4	$C_1 = 1.853e^{-0.363t}$	1.91±0.01	0.0058
		$C_2 = 0.605e^{-0.063(t-3)}$		
	7	$C_t = 2.026e^{-0.127t}$	5.46±0.00	0.0000
	9	$C_t = 1.880e^{-0.200t}$	3.47±0.01	0.0000
HA	1 mg/L	$C_1 = 1.719e^{-0.473t}$	1.47±0.04	0.0000
		$C_2 = 0.761e^{-0.166(t-3)}$		
	5 mg/L	$C_1 = 1.709e^{-0.483t}$	1.44±0.04	0.0000
		$C_2 = 0.672e^{-0.166(t-3)}$		
	10 mg/L	$C_1 = 1.717e^{-0.427t}$	1.62±0.01	0.0001
		$C_2 = 0.501e^{-0.092(t-3)}$		
	20 mg/L	$C_1 = 1.674e^{-0.357t}$	1.94±0.05	0.0096
		$C_2 = 0.910e^{-0.080(t-3)}$		
FA	1 mg/L	$C_1 = 1.777e^{-0.316t}$	2.23±0.48	0.3923
		$C_2 = 1.048e^{-0.081(t-3)}$		
	10 mg/L	$C_1 = 1.793e^{-0.347t}$	2.02±0.29	0.0326
		$C_2 = 0.814e^{-0.071(t-3)}$		
	20 mg/L	$C_1 = 1.782e^{-0.273t}$	2.54±0.14	0.2177
		$C_2 = 0.926e^{-0.046(t-3)}$		
nitrate	0.01 mM	$C_1 = 1.640e^{-0.366t}$	1.90±0.00	0.0047
		$C_2 = 0.960e^{-0.113(t-3)}$		
	0.1 mM	$C_1 = 1.835e^{-0.283t}$	2.45±0.13	0.5222
		$C_2 = 1.050e^{-0.090(t-3)}$		
	1 mM	$C_1 = 1.900e^{-0.280t}$	2.48±0.23	0.4052
		$C_2 = 1.104e^{-0.090(t-3)}$		
iron	0.001 mM	$C_1 = 1.643e^{-0.356t}$	1.95±0.02	0.0104
		$C_2 = 0.877e^{-0.108(t-3)}$		
	0.01 mM	$C_1 = 1.725e^{-0.203t}$	3.43±0.16	0.0000
		$C_2 = 1.210e^{-0.073(t-3)}$		
	0.1 mM	$C_t = 1.749e^{-0.072t}$	9.56±0.09	0.0000
rainwater	/	$C_1 = 1.762e^{-0.518t}$	1.36±0.02	0.0000
		$C_2 = 0.643e^{-0.159(t-3)}$		
tap water	/	$C_1 = 1.703e^{-0.430t}$	1.61±0.03	0.0000
		$C_2 = 0.817e^{-0.180(t-3)}$		
river water	/	$C_1 = 1.651e^{-0.392t}$	1.77±0.02	0.0006
		$C_2 = 0.963e^{-0.219(t-3)}$		
pond water	/	$C_1 = 1.768e^{-0.259t}$	2.68±0.01	0.0379
		$C_2 = 0.888e^{-0.221(t-3)}$		

Table S3 Degradation kinetic parameters of M328 in distilled water, buffer solutions and HA solutions.

Impact factors	Value	Kinetic equations	R	$t_{1/2}$ (h)	*p*
distilled water	/	$C_t = 8.160\times10^7e^{-0.074t}$	-0.9852	9.37±0.00	/
pH	4	$C_t = 7.246\times10^7e^{-0.049t}$	-0.9554	13.95±1.58	0.0000
	7	$C_t = 4.147\times10^7e^{-0.057t}$	-0.9949	12.16±0.00	0.0013
	9	$C_t = 4.563\times10^7e^{-0.060t}$	-0.9963	11.46±0.13	0.0068
HA	1 mg/L	$C_t = 6.221\times10^7e^{-0.080t}$	-0.9912	8.67±0.15	0.2546
	5 mg/L	$C_t = 7.925\times10^7e^{-0.099t}$	-0.9698	7.07±0.10	0.0041
	10 mg/L	$C_t = 6.146\times10^7e^{-0.074t}$	-0.9923	9.30±0.09	0.9130
	20 mg/L	$C_t = 4.936\times10^7e^{-0.067t}$	-0.9749	10.59±0.34	0.0673

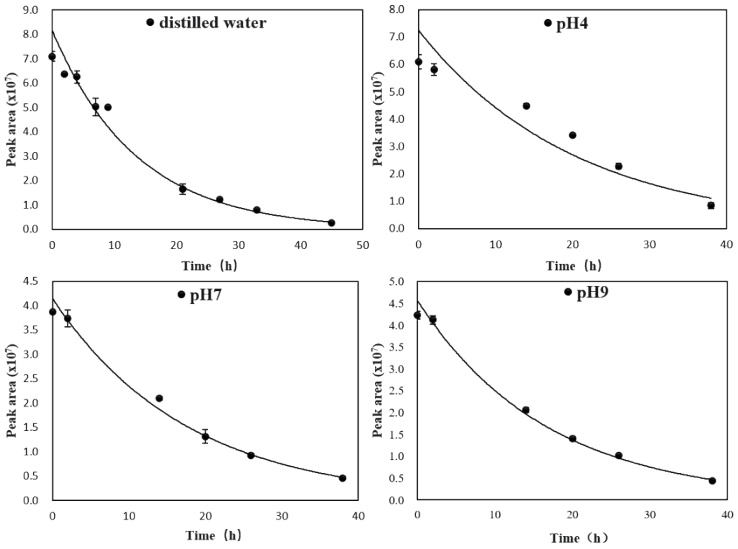

Figure S6 Pseudo first-order kinetics of the degradation of M328 in distilled water and buffer solutions.

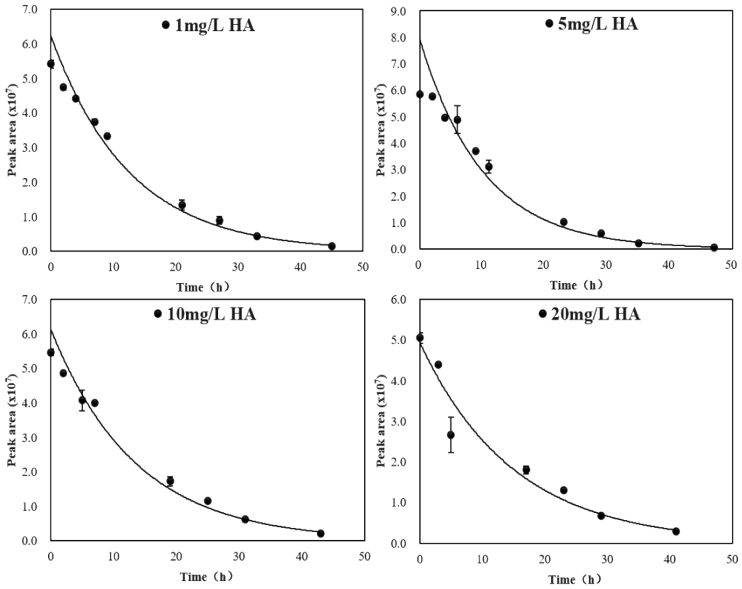

Figure S7 Pseudo first-order kinetics of the degradation of M328 in HA solutions with different concentrations

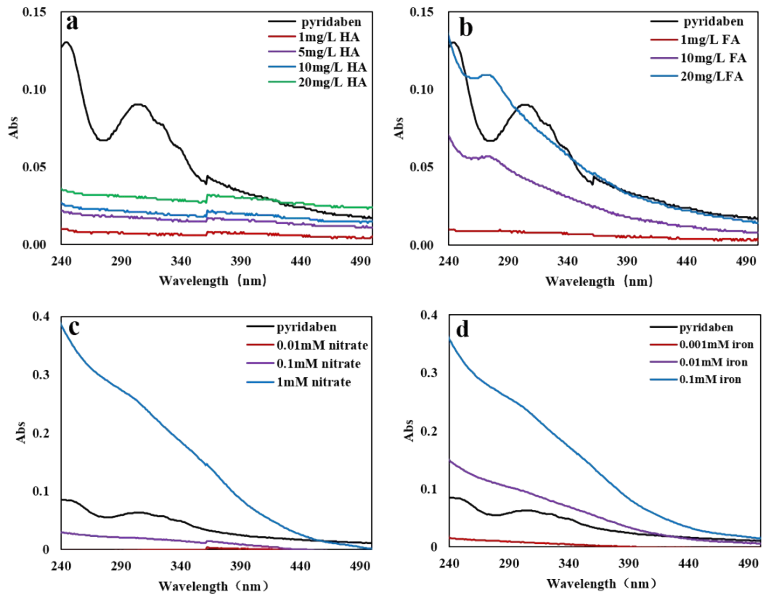

Figure S8 The UV-Vis absorption spectra of pyridaben (2 mg/L) with HA (a), FA (b), nitrate (c), and iron (d)

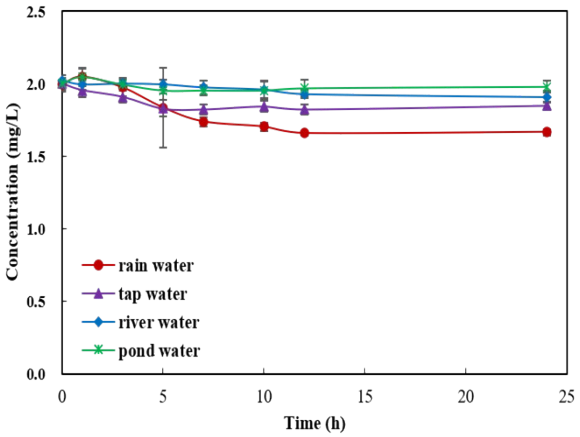

Figure S9 Dark degradation of pyridaben in tap water and natural waters.