

Ecotoxicological and Chemical Approach to Assessing Environmental Effects from Pesticide Use in Organic and Conventional Rice Paddies

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Supplementary Materials

Table S1. Weights assigned to the variables considered in the integrated index for estimating ecotoxicological Hazard Quotient (HQ_{eco}).

Species	End-point (weight)	Matrix (weight)	Exposure (weight)	Toxicity threshold (%)	
<i>Aliivibrio fischeri</i>	Biolumiscence (1.8)	Water (0.9)	Acute (1.0)	15	
		Soil eluate (1.0)		25	
		Soil (em) (0.7)	Acute (1.0)		
		Soil (ch) (0.8)			
<i>Daphnia magna</i>	Survival (2.2)	Water (0.9)	Acute (1.0)	10	
		Eluate (1.0)			
<i>Eisenia</i> sp.	Survival (2.2)	Soil (em) (0.7)	Acute (1.0)	10	
		Soil (ch) (0.8)		20	
	Growth (1.3)	Soil (em) (0.7)	Acute (1.0)		
		Soil (ch) (0.8)			
<i>Lepidium sativum</i>	Germination (2.0)	Soil (em) (0.7)	Acute (1.0)	30	
		Soil (ch) (0.8)			
	Radical elongation (1.1)	Soil (em) (0.7)	Acute (1.0)		
		Soil (ch) (0.8)			
<i>Raphidocelis subcapitata</i>	Algal growth (1.6)	Water (0.9)	Chronic (0.8)	10	
		Soil Eluate (1.0)			
<i>Sinapis alba</i>	Germination (2.0)	Soil (em) (0.7)	Acute (1.0)	30	
		Soil (ch) (0.8)			
	Radical elongation (1.1)	Soil (em) (0.7)	Acute (1.0)		
		Soil (ch) (0.8)			

Table S2. Chemical characterization of soil samples from paddies (RB = organic cultures; RT = conventional cultures). In 2019 RB4 was substitute with RB6. Only values > LOQ are reported (em = paddy embankment soil; ch_ins = inside paddy field chamber soil; ch_in = paddy field chamber entrance soil; ch_out = paddy field chamber exit soil).

2018										
Sample			TOC (%)	TC (%)	TN (%)	Ca (%)	K (%)	Mg (%)	Cu (mg kg ⁻¹)	S (mg kg ⁻¹)
RB1	em	to	1.465	1.325	0.113	0.62	0.64	0.50	15.20	215.38
		t ₁	2.193	2.004	0.173	0.61	0.67	0.53	10.34	285.99
	ch	ins	1.244	1.250	0.102	0.59	0.58	0.49	9.45	244.88
			1.398	1.431	0.118	0.52	0.51	0.47	15.53	213.17
		in	1.684	1.721	0.167	0.40	0.35	0.41	12.73	194.69
			1.214	1.369	0.127	0.49	0.49	0.47	15.53	213.17
	out	to	1.482	1.164	0.132	0.50	0.57	0.47	12.73	194.69
		t ₁								
RB4	em	to	1.696	0.109	0.68	0.51	0.42	6.163	221.43	
		t ₁	1.552	0.123	0.62	0.41	0.38	5.567	283.86	
	ch	in	1.98	1.985	0.167	0.56	0.46	0.37	15.664	297.50
			1.334	1.32	0.089	0.8	0.28	0.29	10.257	170.38
		out	1.597	1.842	0.139	0.55	0.39	0.35	10.287	256.31
RB5	em	to	1.195	1.960	0.200	1.28	0.41	1.14	16.21	325.53
		t ₁	1.807	2.005	0.178	1.64	0.49	1.10	10.98	380.43
	ch	ins	2.053	2.285	0.182	1.50	0.45	1.03	13.12	468.17
			1.304	1.411	0.131	1.57	0.40	1.13	15.53	317.78
		out	0.987	0.862	0.070	1.49	0.37	1.08	15.53	317.78
RT1	em	to	1.564	1.584	0.141	0.50	0.34	0.33	15.20	307.51
		ch	1.539	2.006	0.412	0.62	0.46	0.38	10.152	249.4
			1.614	1.764	0.14	0.53	0.41	0.36	9.921	274.8
	ch	in	1.134	1.266	0.113	0.48	0.37	0.33	17.358	226.81
			1.227	1.198	0.125	0.55	0.33	0.30	15.002	263.42
		out	1.718	1.799	0.159	0.46	0.27	0.30	14.931	320.52
RT4	em	to	1.303	1.399	0.116	0.55	0.52	0.53	14.00	313.68
		ch	1.822	1.946	0.128	0.55	0.55	0.51	15.21	385.54
			1.651	2.836	0.151	0.57	0.59	0.50	13.23	301.94
	ch	out	1.674	1.667	0.175	0.55	0.65	0.47	17.90	349.90
RT5	em	to	2.055	2.106	0.199	1.69	0.41	0.98	13.17	329.78
		ch	2.300	2.313	0.207	1.46	0.46	1.12	15.31	670.39
			2.142	2.246	0.201	1.59	0.58	1.21	18.51	615.68
	ch	in	2.623	2.650	0.273	1.57	0.42	1.03	17.57	574.08
			2.068	2.118	0.215	1.58	0.53	1.24	22.36	630.69
		out	2.275	2.445	0.235	1.52	0.42	1.07	18.02	457.29
		t ₁	1.891	1.873	0.182	1.51	0.40	1.05	15.97	416.75
2019										
RB1	em	to	1.856	1.874	0.167	0.59	0.69	0.50	16.00	259.72
		t ₁	2.072	2.330	0.216	0.53	0.55	0.50	21.79	301.81
	ch	ins	1.595	1.702	0.142	0.42	0.38	0.45	15.58	247.54
			1.342	1.395	0.129	0.59	0.74	0.55	20.66	261.70
		in	1.206	1.360	0.125	0.55	0.72	0.55	21.13	277.80
			0.608	0.967	0.079	0.52	0.63	0.59	22.03	182.40
		t ₁	1.210	1.160	0.105	0.42	0.46	0.48	24.59	224.55

RB5	em		t ₀	1.464	1.813	0.169	1.72	0.40	1.04	3.19	296.80	
			t ₁	1.808	1.921	0.196	1.54	0.36	1.13	4.32	295.49	
	ch	in	t ₀	1.029	1.313	0.118	1.64	0.37	1.00	6.34	250.78	
			t ₁	1.262	1.292	0.118	1.40	0.25	0.99	8.60	373.48	
		out	t ₀	2.155	2.176	0.198	1.59	0.50	1.05	3.40	531.56	
			t ₁	1.954	2.677	0.239	1.45	0.40	1.02	5.67	550.07	
RB6	em		t ₀	2.551	2.531	0.24	1.32	0.47	1.38	24.410	352.79	
			t ₁	1.946	2.216	0.203	1.02	0.33	1.04	20.760	290.34	
	ch	in	t ₀	1.741	2.037	0.177	1.38	0.45	1.14	32.690	269.46	
			t ₁	2.27	3.235	0.291	1.33	0.61	1.14	26.030	432.05	
		out	t ₀	1.536	1.748	0.155	1.3	0.59	1.16	24.240	325.40	
			t ₁	2.442	2.512	0.218	1.24	0.49	1.59	26.480	399.43	
RT1	em		t ₀	2.087	2.107	0.165	0.46	0.42	0.42	16.400	275.21	
			t ₁	1.526	1.655	0.178	0.57	0.53	0.35	14.700	244.93	
	ch	in	t ₀	1.392	1.464	0.152	0.58	0.51	0.38	19.230	315.53	
			t ₁	0.831	1.538	0.141	0.63	0.54	0.40	22.400	302.42	
		out	t ₀	1.216	1.435	0.122	0.29	0.17	0.28	15.700	305.08	
			t ₁	1.168	1.327	0.105	0.59	0.36	0.31	15.470	312.22	
RT4	em		t ₀	2.365	3.403	0.287	0.33	0.25	0.36	19.82	339.13	
			t ₁	1.668	1.669	0.169	1.54	0.62	1.34	31.01	592.29	
	ch	in	t ₀	1.917	1.926	0.182	0.46	0.40	0.40	20.62	432.04	
			t ₁	1.845	1.987	0.175	0.45	0.36	0.40	18.99	345.50	
		out	t ₀	1.810	1.922	0.182	0.52	0.32	0.36	16.39	218.78	
			t ₁	1.906	2.178	0.193	0.56	0.63	0.49	22.67	479.67	
RT5	em		t ₁	2.324	2.458	0.251	1.33	0.38	1.05	18.02	476.87	
	ch	in	t ₁	1.034	1.752	0.19	1.78	0.48	1.10	17.38	548.90	
		out	t ₀	1.087	1.894	0.182	1.61	0.41	1.07	19.68	483.60	

Table S3. Concentration of PPPs measured in soil samples of paddies ($\mu\text{g Kg}^{-1}$). Only data from fields for which at least one value has been quantified are reported (Em = paddy embankment; ch_ins = inside paddy field chamber; ch_in = paddy field chamber entrance; ch_out = paddy field chamber exit).

2018						
Sample			Pendimethalin	Oxyfluorfen	Folpet	Oxadiazon
RT1	ch	em	to	< 0.1	0.1	< 0.1
		ins	to	< 0.1	0.3	< 0.1
		ins	t ₁	< 0.1	0.2	< 0.1
		in	to	< 0.1	< 0.1	< 0.1
	ch	in	t ₁	< 0.1	< 0.1	< 0.1
		out	to	< 0.1	0.1	< 0.1
	ch	out	to	< 0.1	< 0.1	< 0.1
		out	t ₁	< 0.1	< 0.1	< 0.1
RT4	em		to	< 0.1	< 0.1	< 0.1
	ch	ins	to	< 0.1	< 0.1	< 0.1
		ins	t ₁	< 0.1	< 0.1	< 0.1
	out		t ₁	< 0.1	< 0.1	0.2
RT5	em		to	< 0.1	< 0.1	< 0.1
	ch	ins	to	< 0.1	< 0.1	< 0.1
		ins	t ₁	0.3	< 0.1	< 0.1
	ch	in	to	0.2	< 0.1	< 0.1
		in	t ₁	0.9	< 0.1	< 0.1
	out		to	< 0.1	< 0.1	< 0.1
	out		t ₁	< 0.1	< 0.1	0.4
2019						
RT1	em		to	< 0.1	0.2	0.1
	em		t ₁	< 0.1	< 0.1	< 0.1
	ch	in	to	< 0.1	< 0.1	< 0.1
		in	t ₁	< 0.1	< 0.1	< 0.1
RT4	em		to	< 0.1	< 0.1	< 0.1
	em		t ₁	< 0.1	< 0.1	< 0.1
	ch	in	to	< 0.1	< 0.1	0.5
		in	t ₁	< 0.1	< 0.1	< 0.1
RT5	em		to	< 0.1	< 0.1	0.3
	em		t ₁	< 0.1	< 0.1	0.3
	ch	in	to	< 0.1	< 0.1	0.6
		in	t ₁	< 0.1	< 0.1	0.3