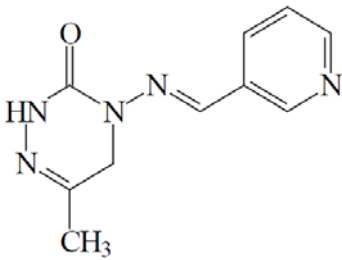


## Supplementary data

**Supplemental Table S1** Main physical and chemical properties of pymetrozine

structural formula	physic-chemical properties
	common name: pymetrozine
	IUPAC name: 6-methyl-4-[(E) - (pyridine-3-ylmethylene) amino]-4,5-dihydro- 2H- [1,2,4]-triazin-3one
	CAS No.: 123312-89-0
	chemical family: pyridine azomethines
	molecular formula: C <sub>10</sub> H <sub>11</sub> N <sub>5</sub> O
	molecular mass: 217.2
	appearance: white odourless powder
	melting point: 217°C
	boiling point: thermal decomposition at about 190°C
	solubility at water: 270 mg L <sup>-1</sup> (pH7, 25°C)
partition coefficient (log <i>P<sub>ow</sub></i> ): -0.18 at pure water	
dissociation constant: 4.06 at 20°C	

**Supplemental Table S2** Information of the studied pymetrozine formulations

pesticide code	trade name	formulation type	content of pymetrozine/%	content of isoprocarb/%	manufacturer
F1	feidian	WP	25	-	Jiangsu Anbang Chemical Co. Ltd., China
F2	zungui	WP	50	-	Jiangsu Kesheng Group Co. Ltd., China
F3	plenum	WG	50	-	Syngenta Crop Protection Plant, Switzerland
F4	tuosheng	WP	10	40	Jiangsu Kesheng Group Co. Ltd., China
F5	sudun	WP	10	20	Jiangsu Lvdun Crop Protection Plant, China

**Supplemental Table S3** HPLC operation conditions for pymetrozine

module	parameter		
column	Agilent Eclipse XDB-C18, 150 × 4.6 mm, 5 μm		
temperature of column	30°C		
mobile phase	methanol, water		
gradient of mobile phase	time/min	water/%	methanol/%
	0.0	75	25
	6.0	40	60
	7.0	75	25
	12.0	75	25
speed of mobile phase/(mL·min <sup>-1</sup> )	1.0		
running time/min	12		
volume of inject/μL	10		
detector	VWD		
wave of VWD/nm	299		

**Supplemental Table S4** Spiked recovery of pymetrozine in water

spiked concentration /(mg·L <sup>-1</sup> )	detecting concentration/(mg·L <sup>-1</sup> )			average recovery/%	RSD/%
	I	II	III		
0.5	0.5012	0.4898	0.5022	99.5	1.38
1.0	0.9978	0.9986	0.9889	99.5	0.54
2.0	1.9987	2.0103	1.9952	100.1	0.39
5.0	5.0124	4.9952	4.9938	100.0	0.21

**Supplemental Table S5** Factorial experiment design for sorption of pymetrozine on soil A

pattern	pesticide form	CaCl <sub>2</sub> conc./( $\text{mol}\cdot\text{L}^{-1}$ )	soil to solution ratio	$K_d/(\text{mL}\cdot\text{g}^{-1})$
- - -	50% WG	0.01	0.05	2.08 (0.36)
+ - -	technical material	0.01	0.05	0.85 (0.13)
- + -	50% WG	1	0.05	1.43 (0.15)
+ + -	technical material	1	0.05	0.72 (0.05)
- - +	50% WG	0.01	0.2	7.17 (0.10)
+ - +	technical material	0.01	0.2	6.30 (0.23)
- + +	50% WG	1	0.2	4.15 (0.28)
+ + +	technical material	1	0.2	4.52 (0.11)