

Supplementary Material

A Quantitative Tandem Mass Spectrometry and Scaled-Down QuEChERS Approach for Simultaneous Analysis of Pesticide Multiresidues in Human Urine

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Table S1. Recoveries and relative standard deviations (RSDs) of 260 pesticides for three versions of urine preparation methods ($n = 3$).

No.	Compound name	Method A		Method B		Method C	
		RCY ¹ (%)	RSD (%)	RCY (%)	RSD (%)	RCY (%)	RSD (%)
1	Acetamidiprid	89.2	6.5	85.1	4.5	84.2	4.2
2	Alachlor	87.7	1.9	85.6	2.9	80.7	0.7
3	Allidochlor	105.7	6.3	96.0	5.9	94.4	3.7
4	Ametoctradin	90.0	2.7	85.6	1.6	84.3	3.6
5	Ametryn	95.4	1.3	83.4	1.7	86.0	2.8
6	Amisulbrom	84.8	0.9	100.6	4.9	70.1	11.9
7	Anilofos	94.8	1.3	86.9	1.5	82.3	1.9
8	Asulam	87.4	2.5	75.2	5.9	87.3	13.4
9	Atrazine	96.7	5.2	89.8	5.0	85.4	6.2
10	Azaconazole	95.3	0.8	89.9	2.5	90.2	1.2
11	Azamethiphos	94.9	3.0	82.7	3.6	85.8	6.1
12	Azimsulfuron	98.2	2.6	86.7	4.6	86.9	3.0
13	Azinphos-methyl	96.0	5.3	91.2	4.8	94.8	2.5
14	Azoxystrobin	89.3	2.5	87.0	1.4	87.7	5.8
15	Bendiocarb	89.9	2.0	84.5	1.5	80.6	8.4
16	Bensulfuron-methyl	92.2	2.1	91.9	5.4	86.7	2.4
17	Bentazone	93.9	8.1	68.8	6.7	83.1	6.3
18	Benthiavalicarb-isopropyl	96.4	3.7	92.2	0.5	82.3	5.3
19	Benzobicyclon	88.1	3.1	88.9	5.9	77.3	3.4
20	Benzoximate	94.2	5.5	81.7	2.7	85.1	7.0
21	Boscalid	92.4	2.3	87.1	8.6	78.5	2.7
22	Bromacil	90.9	2.2	90.0	1.2	83.9	5.6
23	Bromobutide	97.1	2.8	86.6	2.2	84.7	0.9
24	Bupirimate	86.4	1.3	81.8	3.3	84.5	3.8
25	Buprofezin	87.5	4.8	90.3	4.6	90.4	1.8
26	Butachlor	90.8	2.4	86.4	0.3	81.3	0.7
27	Butafenacil	84.1	3.6	83.5	2.5	83.1	6.7

No.	Compound name	Method A		Method B		Method C	
		RCY ¹ (%)	RSD (%)	RCY (%)	RSD (%)	RCY (%)	RSD (%)
28	Cadusafos	91.1	4.1	89.5	6.5	83.0	4.2
29	Carbaryl	89.9	2.3	91.6	3.5	83.3	4.3
30	Carbendazim	89.0	1.8	87.2	1.7	80.9	3.0
31	Carbofuran	94.2	6.1	83.4	3.6	92.1	2.6
32	Carbophenothion	94.3	1.8	86.4	4.0	89.9	0.5
33	Carboxin	93.1	3.9	91.7	6.9	78.0	3.8
34	Carpropamid	102.6	4.1	100.3	7.8	93.4	0.4
35	Cartap	89.9	8.7	80.0	8.0	N.D. ²	N.D.
36	Chlorantraniliprole	86.7	2.8	93.6	6.2	89.9	3.7
37	Chlorfenvinphos	91.3	6.6	87.2	5.2	83.3	6.7
38	Chlorfluazuron	89.6	2.6	91.6	5.0	85.3	5.5
39	Chloridazon	91.0	2.4	92.4	10.2	76.9	11.9
40	Chlorotoluron	96.0	1.1	86.9	5.2	83.9	2.9
41	Chlorsulfuron	100.8	4.1	91.3	4.8	92.0	5.1
42	Chromafenozide	93.3	8.8	89.4	5.1	83.9	9.5
43	Cinmethylin	97.6	3.6	102.8	4.6	84.4	3.2
44	Clofentezine	103.3	1.6	87.1	3.3	89.6	3.7
45	Clomazone	89.7	1.3	84.6	5.5	83.9	3.9
46	Clothianidin	91.0	2.6	80.7	3.1	81.0	16.5
47	Cyanazine	92.2	4.5	89.4	3.8	80.6	2.5
48	Cyazofamid	90.4	3.5	91.9	5.3	90.5	6.5
49	Cyclosulfamuron	86.0	1.1	93.2	4.9	92.2	4.5
50	Cymoxanil	103.2	6.4	82.1	5.9	80.4	4.9
51	Cyproconazole	101.7	2.4	90.6	5.8	81.6	2.1
52	Cyprodinil	94.7	5.1	83.9	2.1	90.9	6.9
53	Daimuron	94.9	4.7	86.2	4.2	84.2	12.6
54	Diazinon	86.7	2.6	92.3	3.3	86.6	3.4
55	Dicrotophos	90.7	0.3	85.6	2.2	82.9	0.8
56	Diethofencarb	96.3	1.7	83.5	0.2	81.5	1.4
57	Difenoconazole	95.1	1.8	87.9	3.3	86.6	4.1
58	Diflubenzuron	87.0	6.8	87.5	3.3	82.2	7.8
59	Diflufenican	107.2	1.0	87.5	1.3	84.0	9.1
60	Dimethachlor	89.1	3.7	88.4	1.9	85.4	3.2
61	Dimethametryn	86.5	3.7	80.3	4.5	80.9	4.2
62	Dimethenamid	90.1	1.5	86.4	0.8	89.9	2.3
63	Dimethoate	91.6	4.3	84.7	2.6	89.7	7.9
64	Dimethomorph	88.5	3.6	84.6	2.0	89.0	2.7
65	Diniconazole	91.5	1.0	93.8	2.5	87.0	4.7
66	Diphenamid	91.7	1.4	85.2	0.6	78.1	2.4
67	Diuron	94.4	2.3	80.4	3.1	82.2	3.4
68	Edifenphos	87.5	4.3	85.5	3.7	79.2	3.6
69	Emamectin B1a	91.2	1.9	86.8	1.3	83.9	1.7
70	Emamectin B1b	89.9	7.5	89.8	3.1	83.2	4.4
71	EPN	95.5	5.3	84.0	3.7	83.5	4.6
72	Epoxiconazole	101.3	3.4	93.3	1.9	86.2	5.5
73	Ethaboxam (EBX)	89.1	5.9	86.5	3.4	82.8	4.8
74	Ethametsulfuron-methyl	89.2	4.4	82.3	3.2	82.3	1.7
75	Ethiofencarb	95.3	1.1	81.3	5.4	86.8	1.8

No.	Compound name	Method A		Method B		Method C	
		RCY ¹ (%)	RSD (%)	RCY (%)	RSD (%)	RCY (%)	RSD (%)
76	Ethion	90.7	2.3	87.5	1.4	85.2	1.4
77	Ethoprophos	89.2	0.3	91.8	2.7	81.2	3.7
78	Ethoxyquin	88.0	6.5	89.7	6.7	90.0	7.3
79	Ethoxysulfuron	87.4	3.4	91.3	4.8	81.1	7.0
80	Etoazole	82.6	1.6	88.2	4.3	78.7	3.5
81	Etrimfos	87.9	1.5	79.3	5.4	80.8	5.6
82	Fenamidone	91.7	5.2	85.0	6.3	83.4	7.7
83	Fenamiphos	92.6	3.2	85.6	2.3	84.5	1.8
84	Fenazaquin	86.4	0.7	89.6	2.6	86.1	3.7
85	Fenbuconazole	107.3	5.9	93.5	5.9	84.6	3.6
86	Fenhexamid	90.3	5.5	92.0	10.8	85.0	5.0
87	Fenobucarb (BPMC)	95.9	2.2	85.3	0.2	84.0	5.3
88	Fenothiocarb	93.3	5.3	88.5	2.6	91.5	7.3
89	Fenoxanil	97.9	2.2	91.4	1.9	89.0	2.0
90	Fenoxycarb	96.0	3.0	87.2	5.7	85.9	2.4
91	Fenthion	96.5	6.3	88.9	1.4	83.9	4.1
92	Ferimzone	83.3	1.4	77.4	5.5	76.5	2.9
93	Fipronil	88.4	4.8	93.7	1.9	89.4	2.3
94	Fluacrypyrim	94.8	3.1	78.2	2.7	85.6	3.2
95	Fluazinam	79.6	2.0	83.4	3.2	91.3	6.8
96	Flucetosulfuron	89.5	5.5	93.2	2.5	88.3	2.5
97	Flufenacet	98.7	2.7	92.6	3.2	83.5	8.1
98	Flufenoxuron	86.4	2.4	87.4	1.8	86.9	4.6
99	Fluopicolide	88.2	7.9	96.7	4.6	87.7	11.0
100	Fluopyram	94.8	2.1	99.5	4.7	85.4	6.3
101	Flusilazole	93.4	1.2	87.0	4.2	86.6	2.9
102	Flusulfamide	96.0	2.5	88.2	4.0	84.6	4.9
103	Flutolanil	89.1	1.6	76.7	4.3	88.3	4.5
104	Fluxapyroxad	102.4	7.5	121.0	8.8	83.2	4.6
105	Fonofos	100.8	0.9	94.6	4.0	96.4	2.9
106	Forchlorfenuron	84.0	5.1	84.3	1.4	85.4	3.1
107	Fosthiazate	88.7	1.1	85.3	3.4	83.5	3.2
108	Furathiocarb	91.8	3.7	83.3	3.2	81.8	1.4
109	Halosulfuron-methyl	87.6	4.7	89.1	3.0	90.5	1.4
110	Haloxyfop-R-Methyl	96.3	3.4	95.6	4.3	84.8	6.0
111	Hexaconazole	97.4	4.6	88.8	0.6	85.0	4.3
112	Hexaflumuron	85.0	13.0	82.0	4.5	82.4	4.2
113	Hexazinone	89.0	5.8	86.6	5.0	81.0	2.6
114	Imazalil	96.3	7.4	90.7	5.5	79.5	7.7
115	Imazapic	56.1	1.3	49.4	6.3	82.7	1.6
116	Imazaquin	89.0	3.3	73.9	2.1	81.4	8.5
117	Imazethapyr	74.2	9.7	77.5	8.0	72.7	2.2
118	Imibenconazole	94.5	2.3	96.8	2.6	86.7	3.0
119	Imicyafos	84.5	6.0	90.8	11.6	99.3	12.8
120	Imidacloprid	86.1	2.5	85.9	5.1	83.8	3.3
121	Indoxacarb	84.3	5.6	82.5	8.8	83.0	6.1
122	Iprobenfos	89.5	2.4	83.3	4.8	81.0	4.9
123	Iprovalicarb	87.9	4.7	87.6	5.9	88.4	2.5

No.	Compound name	Method A		Method B		Method C	
		RCY ¹ (%)	RSD (%)	RCY (%)	RSD (%)	RCY (%)	RSD (%)
124	Isazofos	87.3	2.1	87.4	2.8	87.0	4.4
125	Isoprocarb	104.8	4.7	90.8	3.1	85.5	1.3
126	Isoprothiolane	86.9	5.4	85.5	2.0	91.7	3.8
127	Isoproturon	92.2	4.6	86.8	4.7	86.2	2.2
128	Isopyrazam	82.9	4.1	87.8	3.3	86.5	3.0
129	Isoxathion	87.3	3.6	93.0	2.9	86.0	4.2
130	Kresoxim-methyl	84.6	8.0	80.8	10.8	83.6	3.0
131	Linuron	96.8	5.8	92.3	4.7	84.0	0.9
132	Mandipropamid	84.8	2.4	86.5	4.9	90.6	7.7
133	Mecarbam	90.7	4.8	88.0	6.0	81.7	6.6
134	Mefenacet	89.2	5.7	85.5	2.6	84.3	5.4
135	Mefenpyr-diethyl	100.5	4.0	88.3	2.1	90.2	0.9
136	Mepronil	94.1	8.2	90.5	4.4	84.4	4.9
137	Metalaxyl	91.8	0.6	85.2	2.3	85.3	2.6
138	Metamifop	90.3	2.6	93.0	4.6	87.8	2.6
139	Metazosulfuron	91.7	7.7	89.2	1.4	82.1	6.1
140	Metconazole	97.8	2.0	85.5	3.9	90.8	3.8
141	Methabenzthiazuron	91.9	4.5	88.3	4.6	82.0	4.5
142	Methidathion	87.9	2.6	79.7	8.6	84.0	4.9
143	Methiocarb	99.2	2.4	90.4	5.2	83.9	4.8
144	Methomyl	98.2	4.0	76.2	10.7	88.7	1.5
145	Methoxyfenozide	89.2	9.8	87.8	4.7	91.7	4.2
146	Metobromuron	102.7	8.6	80.2	5.5	84.9	4.7
147	Metolachlor	88.6	2.6	85.9	1.3	85.2	0.6
148	Metolcarb	111.1	4.1	81.6	3.7	87.5	2.4
149	Metominostrobin	101.7	4.0	89.0	2.1	82.3	3.4
150	Metrafenone	96.3	2.5	87.5	2.8	89.7	2.7
151	Mevinphos	91.8	1.7	87.9	9.5	82.3	1.2
152	Milbemectin A4	102.4	2.6	86.1	1.3	75.8	1.7
153	Molinate	88.2	2.1	87.2	5.3	84.7	8.2
154	Monocrotophos	90.1	0.4	83.6	5.3	81.2	5.9
155	Myclobutanil	100.8	7.8	95.2	4.2	81.5	4.0
156	Napropamide	98.3	4.5	85.7	2.7	77.0	4.6
157	Nicosulfuron	79.3	3.3	84.0	2.5	86.8	2.8
158	Nitenpyram	63.1	2.8	66.4	15.4	74.5	3.9
159	Nuarimol	92.8	6.3	87.8	8.8	84.4	9.0
160	Ofurace	86.2	1.9	85.4	7.8	92.4	5.2
161	Omethoate	73.0	7.4	83.8	3.4	89.6	7.3
162	Orysastrobin	103.8	8.4	90.1	1.8	90.0	6.7
163	Oxadiazon	103.2	2.5	84.1	2.3	88.2	1.4
164	Oxadixyl	89.0	4.1	84.4	0.8	81.1	4.2
165	Oxamyl	85.7	2.0	84.3	4.3	88.5	1.0
166	Oxydemeton-methyl	74.1	1.4	80.5	4.3	80.6	3.9
167	Paclobutrazol	99.3	4.9	82.7	2.8	84.0	3.1
168	Pebulate	98.8	4.9	83.3	5.6	87.7	0.9
169	Penconazole	92.2	1.9	87.0	3.1	81.5	2.2
170	Pendimethalin	93.3	2.9	91.9	1.5	87.8	4.7
171	Penoxsulam	93.2	3.5	88.3	0.6	81.8	4.9

No.	Compound name	Method A		Method B		Method C	
		RCY ¹ (%)	RSD (%)	RCY (%)	RSD (%)	RCY (%)	RSD (%)
172	Penthiopyrad	97.4	0.5	86.8	7.0	86.4	0.7
173	Phenmedipham	92.1	5.3	84.1	4.6	86.5	4.1
174	Phenthoate	90.3	2.9	80.7	2.9	82.8	5.3
175	Phosalone	90.6	2.6	92.5	2.4	89.5	0.8
176	Phosmet	90.2	1.7	85.1	3.7	89.0	3.1
177	Phosphamidon	90.0	6.2	86.5	2.4	82.5	1.2
178	Phoxim	108.7	1.3	84.6	3.9	81.7	3.1
179	Picolinafen	89.3	3.0	90.3	2.0	85.3	2.3
180	Picoxystrobin	92.1	4.9	87.9	3.5	85.7	6.0
181	Piperophos	93.6	1.8	85.5	5.1	79.6	5.6
182	Pirimicarb	88.8	1.3	86.5	4.6	82.9	3.5
183	Pirimiphos-ethyl	95.7	3.1	85.9	2.3	84.5	1.0
184	Pirimiphos-methyl	95.1	3.1	87.7	3.9	83.2	6.7
185	Pretilachlor	95.7	0.7	92.0	3.0	92.0	0.9
186	Probenazole	105.4	3.7	89.3	2.9	82.6	7.1
187	Prochloraz	91.3	3.0	88.6	4.5	88.2	5.0
188	Promecarb	97.6	3.1	93.4	3.3	84.6	1.2
189	Prometryn	88.2	1.5	83.5	4.8	79.1	8.8
190	Propachlor	100.6	4.0	93.5	5.1	80.4	2.0
191	Propazine	99.4	5.1	85.3	6.4	86.4	3.3
192	Propiconazole	89.5	2.5	93.0	1.0	85.1	1.9
193	Propisochlor	94.5	4.4	85.6	2.1	89.5	5.2
194	Propoxur	93.3	2.0	87.3	8.0	84.2	7.1
195	Prothiofos	104.8	4.1	95.0	4.5	88.2	5.6
196	Pyraclofos	105.7	5.9	83.5	6.1	79.7	6.6
197	Pyraclostrobin	89.8	2.3	88.2	3.2	85.5	5.8
198	Pyrazolynate	93.2	4.9	96.4	7.1	82.4	1.9
199	Pyrazophos	95.5	4.0	83.4	7.0	84.5	8.1
200	Pyrazoxyfen	91.1	0.6	97.7	0.7	92.3	4.4
201	Pyribenzoxim	82.6	2.2	86.4	6.8	76.2	6.6
202	Pyributicarb	94.8	1.3	84.7	1.0	82.3	2.3
203	Pyridaben	95.1	2.9	84.5	5.1	82.3	2.1
204	Pyridalyl	91.6	1.4	86.0	0.3	86.1	1.8
205	Pyridaphenthion	90.4	7.1	85.9	5.0	86.4	3.5
206	Pyridate	95.3	2.9	81.5	2.8	83.2	1.6
207	Pyrifenoxy	103.1	3.8	85.0	1.4	87.0	4.8
208	Pyriminobac-methyl E	87.9	4.0	87.8	2.4	84.8	1.0
209	Pyriminobac-methyl Z	96.2	4.3	88.0	4.0	82.3	2.9
210	Pyrimisulfan	84.0	9.0	105.8	8.6	91.5	12.7
211	Pyriproxyfen	87.3	3.1	90.5	3.2	90.9	0.8
212	Pyroquilon	94.8	3.5	83.0	4.2	85.7	1.5
213	Quinoclamine	91.9	3.6	87.1	0.7	72.6	21.3
214	Rimsulfuron	93.6	4.0	79.6	3.0	85.2	1.6
215	Saflufenacil	84.2	4.0	86.6	4.0	86.8	6.2
216	Sethoxydim	92.8	1.4	83.9	4.0	79.9	1.8
217	Simazine	101.7	1.0	89.2	4.7	92.4	5.4
218	Simeconazole	83.3	2.5	88.8	3.9	79.8	5.5
219	Simetryn	92.7	1.9	84.4	3.6	79.9	3.3

No.	Compound name	Method A		Method B		Method C	
		RCY ¹ (%)	RSD (%)	RCY (%)	RSD (%)	RCY (%)	RSD (%)
220	Spinetoram (XDE-175-J)	93.7	1.8	93.2	7.1	85.3	5.6
221	Spinosyn A	89.2	4.4	80.6	3.0	81.0	1.7
222	Spinosyn D	93.7	1.7	88.7	4.1	85.9	0.9
223	Spirodiclofen	92.0	2.6	86.0	3.5	86.0	2.9
224	Sulfoxaflor	85.9	2.7	87.8	5.1	91.4	17.7
225	Sulprofos	92.2	0.5	86.4	2.7	82.6	2.0
226	TCMTB	99.3	6.1	93.7	8.4	83.0	10.0
227	Tebuconazole	96.0	5.0	84.7	5.4	84.1	5.5
228	Tebufenozide	101.8	2.1	91.4	7.9	81.4	1.1
229	Tebupirimfos	93.3	1.9	91.2	4.0	91.6	2.2
230	Terbuthylazine	98.4	5.2	90.0	4.6	84.7	2.5
231	Terbutryn	98.8	9.0	82.1	1.6	84.5	3.9
232	Tetrachlorvinphos	94.5	1.4	92.2	2.1	86.9	7.2
233	Tetraconazole	88.9	3.2	90.4	5.1	83.2	6.5
234	Thenylchlor	91.8	1.2	83.2	3.4	86.4	4.8
235	Thiabendazole	92.0	6.2	85.0	4.3	79.8	11.0
236	Thiacloprid	86.4	4.1	89.4	1.9	80.7	9.4
237	Thiazopyr	89.8	6.5	85.3	4.2	87.3	9.3
238	Thidiazuron	86.3	1.5	87.7	2.8	81.8	4.2
239	Thifensulfuron-methyl	88.1	4.7	83.8	3.4	87.7	3.3
240	Thiobencarb	95.0	3.1	93.5	4.4	88.9	4.3
241	Thiodicarb	89.3	2.3	88.6	4.2	84.4	3.9
242	Thiophanate-methyl	96.2	2.3	97.2	3.4	84.2	2.1
243	Tolfenpyrad	84.4	0.3	87.7	3.8	84.3	2.1
244	Triadimefon	96.8	8.0	91.5	5.2	86.0	9.3
245	Triadimenol	100.7	12.6	87.5	8.1	81.0	10.8
246	Tri-allate	97.7	3.2	92.8	3.5	90.2	5.7
247	Triazophos	89.7	5.6	88.7	5.2	86.3	9.7
248	Tribenuron-methyl	97.0	2.9	87.6	4.1	84.8	1.7
249	Tribufos	89.9	1.3	88.9	3.5	89.8	5.3
250	Trichlorfon	102.8	2.7	86.9	4.1	91.5	1.9
251	Tricyclazole	84.7	2.2	86.1	6.6	86.4	5.0
252	Trifloxystrobin	94.0	5.6	83.1	4.4	78.6	3.3
253	Triflumizole	94.1	2.1	90.4	1.9	87.2	3.1
254	Triflumuron	96.3	5.5	89.6	5.7	83.8	4.1
255	Trimethacarb	96.1	1.3	85.1	5.4	85.4	2.8
256	Triticonazole	92.6	2.8	86.9	3.2	88.4	1.3
257	Uniconazole	96.1	6.8	82.4	2.7	86.5	2.5
258	Vamidothion	88.1	3.5	81.8	4.7	82.4	5.3
259	XMC	89.9	1.4	87.9	4.6	85.3	1.0
260	Zoxamide	95.1	1.4	85.5	1.7	84.0	6.4

¹ Recovery.² Not determined.

Table S2. Relative area intensities¹ (100 at solvent standard peak area) of 260 pesticides for three versions of urine preparation methods.

No.	Compound name	Method A		Method B		Method C	
		100 ng/mL	250 ng/mL	100 ng/mL	250 ng/mL	100 ng/mL	250 ng/mL
1	Acetamiprid	64.8	72.5	55.7	55.7	30.4	31.4
2	Alachlor	108.9	113.7	95.9	95.4	90.3	104.6
3	Allidochlor	78.1	72.6	69.2	64.8	51.5	44.7
4	Ametoctradin	101.3	92.7	82.4	92.2	89.1	89.8
5	Ametryn	89.6	80.2	88.8	81.3	79.0	80.1
6	Amisulbrom	94.7	109.6	97.4	78.4	84.4	89.0
7	Anilofos	105.2	94.7	100.8	96.4	91.1	99.5
8	Asulam	50.9	62.3	27.7	40.1	16.4	19.3
9	Atrazine	86.2	92.1	80.3	79.2	62.6	67.5
10	Azaconazole	86.5	71.0	68.5	66.5	68.6	58.8
11	Azamethiphos	56.7	60.6	47.3	44.3	38.0	32.5
12	Azimsulfuron	105.2	89.3	88.8	91.8	91.7	91.5
13	Azinphos-methyl	79.6	94.3	77.5	85.5	58.0	69.5
14	Azoxystrobin	92.5	92.9	77.6	85.4	73.6	74.0
15	Bendiocarb	61.5	69.9	48.3	59.2	36.4	47.5
16	Bensulfuron-methyl	130.1	106.9	97.8	84.0	93.7	83.7
17	Bentazone	84.4	95.8	53.2	79.6	31.4	42.4
18	Benthiavalicarb-isopropyl	108.3	83.2	99.1	69.6	98.1	76.2
19	Benzobicyclon	97.0	85.5	78.2	71.3	84.0	69.3
20	Benzoximate	85.9	91.6	106.8	94.6	98.2	90.7
21	Boscalid	104.8	109.3	98.7	93.3	82.4	85.8
22	Bromacil	61.0	72.0	49.9	60.4	37.4	48.6
23	Bromobutide	89.5	98.9	91.1	103.1	92.6	89.6
24	Bupirimate	92.6	94.4	72.6	86.1	74.7	75.5
25	Buprofezin	111.9	107.6	95.8	96.1	100.7	93.8
26	Butachlor	104.8	104.0	99.1	98.6	96.1	109.0
27	Butafenacil	113.4	114.6	97.1	99.3	113.6	99.3
28	Cadusafos	91.6	97.9	96.5	86.3	104.7	82.1
29	Carbaryl	60.3	73.9	52.5	55.5	40.0	41.3
30	Carbendazim	71.2	73.5	50.0	54.9	57.5	55.0
31	Carbofuran	85.5	86.8	66.8	80.0	59.4	60.3
32	Carbophenothion	114.9	108.9	109.9	99.0	109.2	98.6
33	Carboxin	64.9	73.6	57.6	58.6	49.2	48.7
34	Carpropamid	97.8	78.5	76.8	66.8	78.1	68.7
35	Cartap	100.1	81.4	73.5	79.6	N.D. ²	N.D.
36	Chlorantraniliprole	84.4	89.8	70.1	69.2	62.4	64.2
37	Chlorfenvinphos	82.2	108.7	85.2	92.1	73.8	100.2
38	Chlorfluazuron	120.4	108.8	102.7	106.5	103.9	107.0
39	Chloridazon	42.1	41.1	27.7	29.1	17.0	15.1
40	Chlorotoluron	57.1	60.5	47.9	47.7	40.6	43.4
41	Chlorsulfuron	123.2	120.8	110.4	102.8	105.0	90.8
42	Chromafenozide	86.0	81.6	110.5	91.5	82.4	84.8

No.	Compound name	Method A		Method B		Method C	
		100	250	100	250	100	250
		ng/mL	ng/mL	ng/mL	ng/mL	ng/mL	ng/mL
43	Cinmethylin	79.4	93.4	96.3	101.1	94.6	110.4
44	Clofentezine	119.6	112.1	108.4	123.5	108.5	116.2
45	Clomazone	88.3	97.8	75.9	76.0	57.4	64.5
46	Clothianidin	44.3	59.0	45.4	48.1	27.7	25.4
47	Cyanazine	86.7	88.6	66.5	60.0	58.4	57.4
48	Cyazofamid	118.1	113.4	99.7	102.4	105.2	104.7
49	Cyclosulfamuron	103.8	99.8	77.0	78.7	78.5	71.7
50	Cymoxanil	55.9	54.4	37.6	39.3	23.3	26.8
51	Cyproconazole	97.5	83.6	95.5	80.7	88.1	88.8
52	Cyprodinil	99.2	97.9	79.6	83.6	93.1	70.3
53	Daimuron	91.8	97.5	81.0	87.1	68.5	84.2
54	Diazinon	113.9	108.4	98.3	101.5	118.8	103.5
55	Dicrotophos	90.5	79.6	71.9	71.3	44.8	41.3
56	Diethofencarb	95.0	83.9	90.4	81.7	77.7	73.3
57	Difenoconazole	118.9	115.8	115.6	114.5	121.3	115.1
58	Diflubenzuron	109.2	129.2	95.0	113.1	88.5	102.9
59	Diflufenican	98.3	81.6	85.7	86.2	85.3	82.3
60	Dimethachlor	97.0	101.6	79.1	82.3	69.6	68.3
61	Dimethametryn	106.5	101.2	87.9	89.8	84.4	90.4
62	Dimethenamid	83.6	89.8	69.8	82.9	72.0	64.4
63	Dimethoate	57.2	62.8	52.1	53.0	28.6	25.8
64	Dimethomorph	137.5	127.4	108.9	112.5	100.9	87.1
65	Diniconazole	109.9	116.6	116.7	107.3	114.3	114.8
66	Diphenamid	91.4	80.8	78.9	79.0	72.5	72.4
67	Diuron	79.3	86.4	63.2	76.6	57.1	66.3
68	Edifenphos	113.5	122.8	121.2	98.0	107.9	112.8
69	Emamectin B1a	118.1	123.2	123.2	112.2	119.2	115.0
70	Emamectin B1b	119.6	132.6	132.5	116.6	114.5	137.5
71	EPN	84.5	93.2	81.7	74.3	66.7	73.0
72	Epoxiconazole	108.3	99.2	106.2	100.4	103.4	110.8
73	Ethaboxam (EBX)	82.1	100.2	80.8	86.0	64.3	80.8
74	Ethametsulfuron-methyl	105.9	117.3	92.1	96.5	80.7	83.3
75	Ethiofencarb	67.5	70.0	62.1	64.0	53.1	50.3
76	Ethion	111.6	110.0	107.8	96.0	99.5	104.4
77	Ethoprophos	100.5	92.8	76.1	85.4	77.5	81.1
78	Ethoxyquin	107.6	94.3	75.5	80.9	70.5	70.6
79	Ethoxysulfuron	148.8	142.9	121.4	111.9	122.5	130.5
80	Etoxazole	94.0	103.8	88.9	75.8	88.6	84.8
81	Etrimfos	94.9	107.0	107.4	102.6	100.5	98.7
82	Fenamidone	110.6	110.9	84.6	91.7	76.2	74.2
83	Fenamiphos	113.2	109.6	101.0	96.5	95.3	89.3
84	Fenazaquin	106.2	107.6	91.5	84.8	87.6	86.2
85	Fenbuconazole	99.7	92.7	94.1	106.7	90.9	111.3
86	Fenhexamid	122.0	114.0	112.8	110.1	115.9	103.4

No.	Compound name	Method A		Method B		Method C	
		100	250	100	250	100	250
		ng/mL	ng/mL	ng/mL	ng/mL	ng/mL	ng/mL
87	Fenobucarb (BPMC)	95.4	92.4	72.3	79.0	66.1	73.4
88	Fenothiocarb	90.6	92.4	87.5	89.8	70.2	73.3
89	Fenoxanil	94.7	91.5	89.9	87.0	78.3	77.4
90	Fenoxycarb	98.3	83.1	80.7	81.9	80.9	89.3
91	Fenthion	109.7	102.9	100.2	100.8	98.8	111.0
92	Ferimzone	89.4	100.9	75.8	79.0	58.5	61.0
93	Fipronil	129.4	115.6	125.8	118.0	145.1	126.6
94	Fluacrypyrim	88.0	85.9	98.6	106.6	95.3	92.4
95	Fluazinam	110.3	116.8	114.1	108.6	113.5	109.5
96	Flucetosulfuron	180.7	179.8	133.4	133.9	131.9	147.6
97	Flufenacet	75.0	83.2	82.3	86.3	74.2	96.0
98	Flufenoxuron	107.9	117.8	99.7	101.9	103.9	106.8
99	Fluopicolide	97.6	128.1	80.6	88.1	73.5	83.0
100	Fluopyram	84.7	88.0	83.0	73.3	77.3	82.8
101	Flusilazole	106.6	103.5	100.3	99.5	82.9	90.0
102	Flusulfamide	102.3	119.7	114.6	121.7	109.7	133.9
103	Flutolanil	112.6	91.5	92.2	78.3	77.5	71.0
104	Fluxapyroxad	102.7	91.2	88.8	60.9	68.9	66.1
105	Fonofos	114.3	101.2	117.2	100.3	114.0	90.3
106	Forchlorfenuron	95.7	98.5	86.4	85.9	80.2	79.7
107	Fosthiazate	73.0	69.6	62.1	58.5	50.9	51.7
108	Furathiocarb	95.1	98.7	89.9	95.8	97.5	101.2
109	Halosulfuron-methyl	143.6	124.5	123.3	112.4	123.6	123.3
110	Haloxypop-R-Methyl	111.0	110.4	99.5	104.1	95.3	111.7
111	Hexaconazole	99.4	114.5	111.5	106.3	102.3	111.9
112	Hexaflumuron	94.1	103.2	126.4	124.5	117.7	113.8
113	Hexazinone	70.8	84.8	58.7	62.7	48.0	52.8
114	Imazalil	94.8	73.4	76.2	66.2	68.1	60.0
115	Imazapic	58.3	63.7	36.6	41.8	29.3	29.0
116	Imazaquin	85.6	87.8	70.6	81.4	66.0	75.4
117	Imazethapyr	61.2	55.2	41.3	42.0	39.8	35.1
118	Imibenconazole	110.2	99.3	111.7	91.8	100.5	95.8
119	Imicyafos	64.6	85.3	57.6	55.4	41.4	37.5
120	Imidacloprid	76.7	72.9	66.1	51.9	32.4	30.4
121	Indoxacarb	101.9	100.5	93.7	100.3	97.3	101.2
122	Iprobenfos	86.6	86.6	65.4	67.2	57.2	64.1
123	Iprovalicarb	97.6	99.7	91.7	89.8	90.8	77.6
124	Isazofos	102.7	105.4	79.5	88.9	88.7	76.9
125	Isoproc carb	72.9	61.4	58.8	59.0	50.2	54.4
126	Isoprothiolane	105.7	100.7	73.1	84.0	76.5	74.5
127	Isoproturon	89.0	94.3	82.7	83.3	66.2	70.5
128	Isopyrazam	92.9	110.1	92.0	84.9	88.9	82.3
129	Isoxathion	99.0	119.6	99.9	99.7	91.4	103.6
130	Kresoxim-methyl	90.2	97.6	73.7	77.7	69.7	75.7

No.	Compound name	Method A		Method B		Method C	
		100 ng/mL	250 ng/mL	100 ng/mL	250 ng/mL	100 ng/mL	250 ng/mL
131	Linuron	81.9	82.3	89.3	79.8	61.7	76.1
132	Mandipropamid	98.2	92.2	71.4	77.8	70.2	66.4
133	Mecarbam	90.5	96.9	109.3	98.8	94.5	112.9
134	Mefenacet	102.0	109.9	83.0	90.7	96.1	79.5
135	Mefenpyr-diethyl	92.9	72.6	83.0	82.1	92.4	74.4
136	Mepronil	96.4	103.9	76.2	88.6	70.8	79.7
137	Metalaxyl	89.4	85.6	66.5	73.7	64.9	64.2
138	Metamifop	110.7	104.2	118.0	96.4	116.7	107.1
139	Metazosulfuron	162.4	141.4	157.3	130.8	139.4	134.4
140	Metconazole	109.6	109.4	103.8	111.1	104.7	96.8
141	Methabenzthiazuron	71.2	70.0	58.5	63.4	58.6	54.0
142	Methidathion	83.0	86.5	82.7	93.6	79.5	70.8
143	Methiocarb	83.0	80.2	79.6	66.9	64.5	63.1
144	Methomyl	50.3	49.6	36.7	38.5	13.9	16.4
145	Methoxyfenozide	88.4	63.0	62.7	62.5	64.4	57.7
146	Metobromuron	63.3	50.3	48.8	50.6	34.3	42.7
147	Metolachlor	92.7	89.0	83.9	74.7	73.9	71.1
148	Metolcarb	69.0	67.4	50.5	65.0	39.7	45.8
149	Metominostrobin	80.2	94.8	60.4	81.3	62.1	77.7
150	Metrafenone	118.2	109.5	119.1	114.3	122.0	96.5
151	Mevinphos	68.5	66.2	46.8	40.0	27.7	26.3
152	Milbemectin A4	116.6	108.0	117.8	116.4	147.0	115.6
153	Molinate	107.8	119.4	102.3	105.7	97.1	104.7
154	Monocrotophos	60.1	65.4	47.1	52.0	23.7	26.9
155	Myclobutanil	133.0	94.1	122.6	98.0	104.5	110.2
156	Napropamide	87.3	90.9	84.4	78.0	80.2	87.0
157	Nicosulfuron	86.7	93.4	63.9	66.5	53.4	58.0
158	Nitenpyram	132.4	136.2	60.4	54.6	30.6	25.5
159	Nuarimol	106.6	103.1	103.4	101.7	79.4	90.2
160	Ofurace	69.4	74.2	54.2	59.8	44.2	40.9
161	Omethoate	40.8	45.3	33.3	34.6	19.9	17.2
162	Oryastrobin	94.9	88.0	101.4	89.7	89.3	92.2
163	Oxadiazon	109.7	116.0	112.6	120.1	111.0	104.4
164	Oxadixyl	51.1	54.5	33.6	36.3	22.1	26.6
165	Oxamyl	56.7	51.7	44.3	43.0	16.9	17.7
166	Oxydemeton-methyl	56.3	63.8	50.6	47.6	26.5	27.7
167	Paclobutrazol	101.4	81.6	85.5	82.9	62.3	78.7
168	Pebulate	119.0	111.0	103.0	124.9	114.9	104.8
169	Penconazole	87.2	114.6	90.8	101.8	90.1	104.7
170	Pendimethalin	98.3	109.4	100.6	100.1	94.8	97.8
171	Penoxsulam	122.4	117.6	114.7	102.7	82.4	89.2
172	Penthiopyrad	113.7	95.1	89.2	93.8	84.2	90.0
173	Phenmedipham	89.1	96.9	76.2	82.1	67.9	68.7
174	Phenthoate	89.1	107.7	84.0	93.0	69.2	80.3

No.	Compound name	Method A		Method B		Method C	
		100	250	100	250	100	250
		ng/mL	ng/mL	ng/mL	ng/mL	ng/mL	ng/mL
175	Phosalone	110.0	123.1	120.9	110.0	101.9	111.5
176	Phosmet	83.8	106.0	84.3	92.8	65.5	72.1
177	Phosphamidon	77.3	81.1	60.4	64.3	48.2	52.2
178	Phoxim	106.0	98.6	93.8	97.8	95.3	106.8
179	Picolinafen	111.6	119.2	113.5	113.5	121.4	111.5
180	Picoxystrobin	86.0	92.3	96.9	84.3	90.7	88.2
181	Piperophos	107.3	111.9	101.4	102.1	112.0	104.9
182	Pirimicarb	81.1	88.7	64.8	69.8	52.6	56.8
183	Pirimiphos-ethyl	103.3	100.4	101.3	102.1	111.7	103.8
184	Pirimiphos-methyl	103.1	106.9	92.8	113.6	95.1	106.8
185	Pretilachlor	107.0	103.2	105.1	95.4	105.4	96.2
186	Probenazole	54.1	51.2	39.6	40.0	26.9	28.8
187	Prochloraz	104.6	110.1	111.5	100.0	110.5	95.0
188	Promecarb	89.5	90.0	81.5	72.4	69.4	67.8
189	Prometryn	100.2	103.5	86.3	82.8	72.9	82.3
190	Propachlor	84.5	83.8	71.5	70.1	66.9	73.0
191	Propazine	84.7	90.6	82.6	83.0	63.3	68.0
192	Propiconazole	108.1	121.1	115.2	108.2	125.7	117.1
193	Propisochlor	101.7	107.6	95.4	93.8	94.4	97.2
194	Propoxur	59.1	65.8	56.0	53.9	38.2	40.3
195	Prothiofos	106.3	106.2	106.6	115.2	105.7	99.3
196	Pyraclufos	93.6	84.4	89.2	90.7	83.9	97.9
197	Pyraclostrobin	114.0	105.7	107.3	96.7	99.6	90.8
198	Pyrazolynate	95.8	85.7	87.3	69.2	86.5	75.8
199	Pyrazophos	103.6	98.1	99.6	91.5	103.6	93.8
200	Pyrazoxyfen	98.7	95.9	101.9	81.6	93.2	84.1
201	Pyribenzoxim	105.7	99.1	85.2	79.5	82.7	92.9
202	Pyributicarb	85.5	94.5	93.5	95.1	99.3	93.6
203	Pyridaben	90.4	90.6	88.6	90.5	81.9	80.9
204	Pyridalyl	124.1	116.4	110.5	109.6	102.1	103.3
205	Pyridaphenthion	95.5	83.0	77.7	74.5	64.0	71.9
206	Pyridate	103.3	103.9	104.8	100.1	110.4	97.5
207	Pyrifenox	86.6	80.6	75.3	83.8	74.8	74.2
208	Pyriminobac-methyl E	98.2	91.5	84.9	88.8	94.5	81.0
209	Pyriminobac-methyl Z	93.9	86.2	86.1	74.8	83.6	79.0
210	Pyrimisulfan	93.2	109.9	78.2	71.2	73.6	60.5
211	Pyriproxyfen	87.9	95.9	91.6	95.5	101.7	86.7
212	Pyroquilon	60.2	73.7	56.5	60.1	31.6	45.5
213	Quinoclamine	50.7	48.4	40.9	43.2	38.8	34.9
214	Rimsulfuron	104.0	109.0	93.3	99.2	87.3	78.1
215	Saflufenacil	184.2	184.4	141.0	160.2	138.4	134.6
216	Sethoxydim	84.5	84.6	74.1	80.2	90.3	78.6
217	Simazine	64.7	57.9	48.9	50.2	39.4	40.0
218	Simeconazole	91.9	111.4	110.7	103.8	100.6	107.4

No.	Compound name	Method A		Method B		Method C	
		100	250	100	250	100	250
		ng/mL	ng/mL	ng/mL	ng/mL	ng/mL	ng/mL
219	Simetryn	76.1	83.4	67.7	75.5	63.2	67.6
220	Spinetoram (XDE-175-J)	97.9	102.0	81.0	96.8	98.3	106.5
221	Spinosyn A	97.3	86.5	91.0	84.3	93.8	91.4
222	Spinosyn D	116.6	111.0	109.7	103.0	99.3	105.8
223	Spirodiclofen	92.1	101.4	92.3	94.3	93.2	99.5
224	Sulfoxaflor	38.3	50.5	38.9	42.4	19.5	20.8
225	Sulprofos	97.4	109.2	112.4	97.9	103.0	101.5
226	TCMTB	96.9	94.2	102.7	85.8	77.8	83.2
227	Tebuconazole	106.4	98.4	92.6	103.0	93.3	105.7
228	Tebufenozide	77.7	83.2	81.0	94.3	94.8	84.8
229	Tebupirimfos	92.5	94.0	81.4	94.0	79.6	81.0
230	Terbutylazine	86.4	81.7	70.2	67.7	59.5	59.7
231	Terbutryn	90.5	81.5	82.0	82.5	85.8	76.0
232	Tetrachlorvinphos	100.7	103.0	101.1	102.6	92.6	96.0
233	Tetraconazole	90.5	99.0	97.6	99.5	97.0	96.8
234	Thenylchlor	87.7	96.7	94.0	99.5	85.8	97.6
235	Thiabendazole	46.2	50.2	42.9	38.5	24.2	20.1
236	Thiacloprid	45.5	45.5	26.3	24.0	18.4	17.5
237	Thiazopyr	101.8	112.0	98.5	101.1	108.4	103.1
238	Thidiazuron	114.2	111.4	83.5	89.0	74.2	75.4
239	Thifensulfuron-methyl	99.9	90.7	72.0	80.3	63.4	62.9
240	Thiobencarb	119.5	116.8	105.9	99.7	115.2	93.6
241	Thiodicarb	88.5	89.3	78.7	78.5	69.7	68.8
242	Thiophanate-methyl	51.7	51.6	34.4	35.8	26.7	30.6
243	Tolfenpyrad	113.3	132.1	106.4	102.2	109.3	112.3
244	Triadimefon	124.0	109.0	116.0	93.1	92.5	91.5
245	Triadimenol	136.5	112.7	125.9	130.7	122.7	121.3
246	Tri-allate	115.7	121.8	121.4	105.7	108.5	117.2
247	Triazophos	101.7	101.5	80.6	93.0	91.4	85.2
248	Tribenuron-methyl	86.7	73.3	58.9	54.5	56.5	54.3
249	Tribufos	95.6	110.0	98.3	97.5	96.1	82.4
250	Trichlorfon	67.2	71.9	58.2	60.9	32.1	36.2
251	Tricyclazole	40.3	43.1	28.9	29.4	17.6	17.6
252	Trifloxystrobin	99.2	91.3	86.5	87.9	102.0	88.8
253	Triflumizole	85.6	95.1	82.7	84.1	86.6	84.2
254	Triflumuron	122.0	106.6	99.6	106.3	107.8	112.5
255	Trimethacarb	90.6	97.5	85.2	86.0	69.2	70.4
256	Triticonazole	104.7	90.8	97.8	94.9	158.8	152.5
257	Uniconazole	100.3	97.0	97.3	93.1	140.4	155.3
258	Vamidothion	71.5	82.4	54.6	60.7	34.9	35.2
259	XMC	75.0	93.1	71.8	73.1	14.2	14.8
260	Zoxamide	115.3	108.5	107.5	106.4	44.4	44.0

$$^1 \text{ Relative peak intensity} = \left(\frac{\text{Peak area of post spiked sample}}{\text{Peak area of solvent standard}} \right) \times 100.$$

² Not determined.

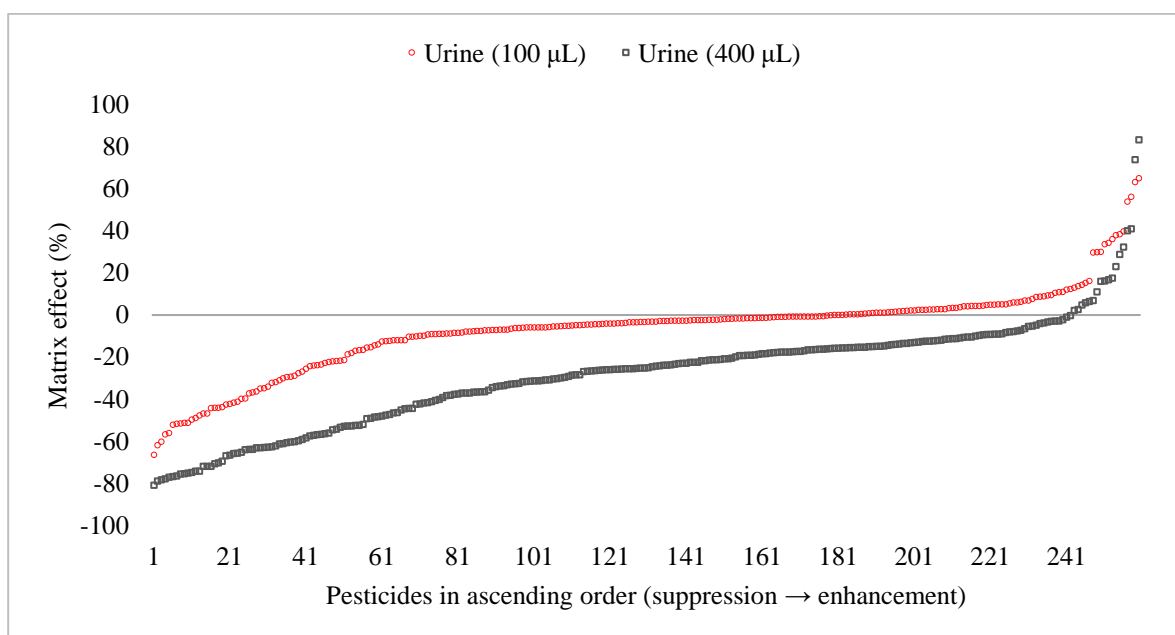


Figure S1. Matrix effects of 260 pesticides in 100 μL and 400 μL of urine samples. The samples were extracted with the same volumes of solvent (400 μL). Each graph was plotted against the number of pesticides ranked by matrix effect values (%).

