Development and validation of a multiresidue method for high fat content commodities: coffee and cocoa beans

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1. Aim and scope

This document reports the validation data for 361 pesticides included in the European Union Multi Annual Control Program (EU-MACP) [1] and the Working Document SANCO/12745/2013 [2], among others, using a multiresidue method by LC-MS/MS and GC-MS/MS. An automatic extraction method based on automated pressurized liquid extraction employing the EDGE instrument has been developed for the extraction of these residues in coffee and cocoa beans.

2. Short description

A new automatic extraction method based on the use of the EDGE instrument has been validated for 361 pesticides in coffee and cocoa beans. With that purpose, homogeneous samples have been spiked at two concentration levels (0.010 mg/kg and 0.050 mg/kg) and extracted automatically. The EDGE instrument combines the process of Pressurised Fluid Extraction (PFE) and Dispersive Solid Phase Extraction (dSPE) in one instrument. The obtained extracts have been analysed by GC-MS/MS and LC-MS/MS.

The validation of the extraction method has been performed in terms of accuracy (recoveries at 0.010 mg/kg and 0.050 mg/kg), repeatability (five replicates), matrix effect and linearity. The recovery results have been compared to those obtained by the QuEChERS extraction method, showing a considerable improvement.

3. Apparatus and consumables

- Automatic pipettes, suitable for handling volumes from 1 µL to 5 mL
- Graduated 10 mL pipette
- 50 mL and 15 mL PTFE centrifuge tubes
- Vortex Shaker IKATM 4 Basic
- Axial shaker Agytax SR1 CP57
- Centrifuge Orto Alresa Consul 21, suitable for the centrifuge tubes employed in the procedure and capable of achieving 4000 rpm
- Concentration workstation
- Injection vials, 2 mL, suitable for LC and GC auto-sampler
- Amber vials, 7 mL

- EDGE instrument supplied by CEM (Charlotte, North Carolina, United States of America)
- Q-Discs® (CEM) G1 and C9 varieties
- Q-Cups (CEM)
- Laboratory grade fine sand (Panreac, Germany)

4. Chemicals

- Acetonitrile ultra-gradient grade
- Trisodium citrate dihydrate
- Disodium hydrogenocitrate sesquihydrate
- Sodium chloride
- Anhydrous magnesium sulphate
- Bondesil - C18 (40 μm)
- Primary secondary amine (PSA)
- Ammonium formate
- Ultra-pure water
- Methanol HPLC grade
- Formic acid
- Ethyl acetate
- Pesticide analytical standards

5. Procedure

5.1. Recovery experiments for method validation

Individual pesticide stock solutions (1000–2000 mg/L) were prepared in acetonitrile or ethyl acetate and were stored in screw-capped glass vials in the dark at -20 °C.

For spiking, representative portions of the previously homogenised samples were spiked homogenously with the appropriate amount of the working standard solution in acetonitrile. The validation methods were performed at two fortification levels (0.01 and 0.05 mg/kg). Five replicates were analysed at each level.

5.2. Extraction methods

5.2.1. Automated sample extraction using the EDGE instrument

First, a layered Q-Disc® setup is placed in the Q-Cup in the following way: a C9 (cellulose) Q-Disc®, then, a G1 (glass fibre) Q-Disc® and, finally, a second C9 Q-Disc® on top of the G1 one. Following this step, 4 g of sample (after cryogenic milling) are weighed into the Q-Cup and the sample is covered by approximately 5 g of fine laboratory grade sand. When weighing the sample into the Q-Cup, it is important to make the material sit as flat and as close to the bottom as possible to ensure that the solvent will completely cover the sample. The Q-Cup is placed into the EDGE instrument alongside a 50 mL PTFE falcon tube, which is used to collect the sample extract.

The method optimized for the EDGE extraction is the following: the solvent used is AcN in two consecutive cycles. During the first extraction cycle, the Q-Cup containing the sample is loaded within the instrument, sealed, and 10 mL AcN are added. The sample and the solvent are heated up to 40 °C, pressurized at 2 bar and these parameters are held for 150 sec. Afterwards, the 10 mL of AcN extract are transferred into the collection PTFE tube. In a second extraction cycle -the rinse cycle-, an additional volume of 5 mL AcN is added to the Q-Cup, let to mix with the sample for a short time, and then transferred into the collection PTFE tube. The total extraction volume is 15 mL. Finally, a wash step is performed by passing 10 mL of AcN at 40 °C to prepare the EDGE instrument for the next sample extraction.

5.2.2 QuEChERS extraction method

1. Weigh 5 g of homogenate sample (after cryogenic milling) in a 50-mL PTFE centrifuge tube.
2. Add 5 mL of water, shake and let it sit for 30 min.
3. Add 10 mL acetonitrile.
4. Shake the samples in an Agitax axial extractor for 4 min.
5. Add 4 g anhydrous magnesium sulphate, 1 g sodium chloride, 1 g trisodium citrate dihydrate and 0.5 g disodium hydrogencitrate sesquihydrate.
6. Shake the samples in an Agitax axial extractor for 4 min.
7. Centrifuge at 4000 rpm for 5 min.
8. Transfer a 5-mL aliquot of the supernatant to a 15 mL PTFE tube containing 750 mg anhydrous magnesium sulphate, 125 mg PSA and 125 mg C18.
9. Vortex the tubes for 30 sec.
10. Centrifuge at 4000 rpm for 5 min.
11. Acidify with 10 µL formic acid 5 % per mL of extract.

5.3. Vial preparation

Extraction method	LC-QqQ-MS/MS	GC-QqQ-MS/MS
Automated sample extraction using the EDGE	5-fold dilution with ultrapure water	Solvent change to ethyl acetate
QuEChERS	5-fold dilution with ultrapure water	Solvent change to ethyl acetate

During the vial preparation, dimethoate-D_6 (LC) or lindane-D_6 (GC) were added as internal standards (50 µg/L).

5.4. Methodology

Both LC and GC systems were operated in multiple reaction monitoring mode (MRM). Selected reaction monitoring (SRM) experiments were carried out to obtain the maximum sensitivity for the detection of the target molecules. For confirmation of the studied compounds, two SRM transitions and a correct ratio between the abundances of the two optimised SRM transitions (SRM2/SRM1) were used, along with retention time matching. The mass transitions used are presented in Appendix I (Table 1 for LC-MS/MS and Table 2 for GC-MS/MS parameters).

5.5. Instrumentation and analytical conditions for the LC- MS/MS system

5.5.1. UHPLC (SCIEX Exion LC)

- Column: Zorbax Eclipse Plus C8 2.1x100 mm and 1.8 µm particle size (Agilent)
- Mobile phase A: Water (0.1 % formic acid, 5 mM ammonium formate, 2 % MeOH)
- Mobile phase B: Methanol (0.1 % formic acid, 5 mM ammonium formate, 2 % water)
- Column temperature: 35 °C
- Flow rate: 0.3 mL/min
- Injection volume: 2.5 µL

Mobile phase gradient for pesticides analysis:

Time [min]	Mobile phase A	Mobile phase B
0	100 %	0 %
1	90 %	10 %
2	70 %	30 %
3	50 %	50 %
11	0 %	100 %
14	0 %	100 %
14.1	100 %	0 %
17	100 %	0 %

5.5.2. Triple quadrupole system (SCIEX 6500+)

Ionisation mode: polarity switching

- Positive polarity:
  - Curtin gas: 25
  - Collision gas: 7
  - IonSpray Voltage: 5500
  - Temperature: 300
  - Ion source gas 1: 40
  - Ion source gas 2: 50
- Negative polarity:
  - Curtin gas: 25
  - Collision gas: 7
  - IonSpray Voltage -4500
  - Temperature: 300
  - Ion source gas 1: 40
  - Ion source gas 2: 50

5.6. Instrumentation and analytical conditions for the GC- MS/MS system

5.6.1. Intuvo 9000 GC system (Agilent)

- Column: 2 Planar columns HP-5MS UI (15 m long × 0.25 mm i.d. × 0.25 µm film thickness)
- Injection mode: Splitless
- Ultra-inert inlet liner with a glass wool frit from Agilent

- Injection volume: 1 µl
- Injector temperature: 80 °C hold for 0.1 min, then up to 300 °C at 600 °C/min, hold for 5 min and then to 250 °C at 100 °C/min.
- Carrier gas: Helium at constant flow = 1.28 mL/min column 1, 1.48 mL/min column 2.
- Carrier gas purity: 99.999 %
- Oven temperature: 60 °C for 0.5 min, up to 170 °C at 80 °C/min, and up to 310 °C at 20 °C/min.

5.6.2. 7410 triple quadrupole system (Agilent)

- Ionisation mode: electron impact ionisation
- Temperature of the transfer line: 280 °C
- Temperature of ion source: 280 °C
- Collision gas: nitrogen
- Collision gas purity: 99.999 %
- Solvent delay: 2.6 minutes

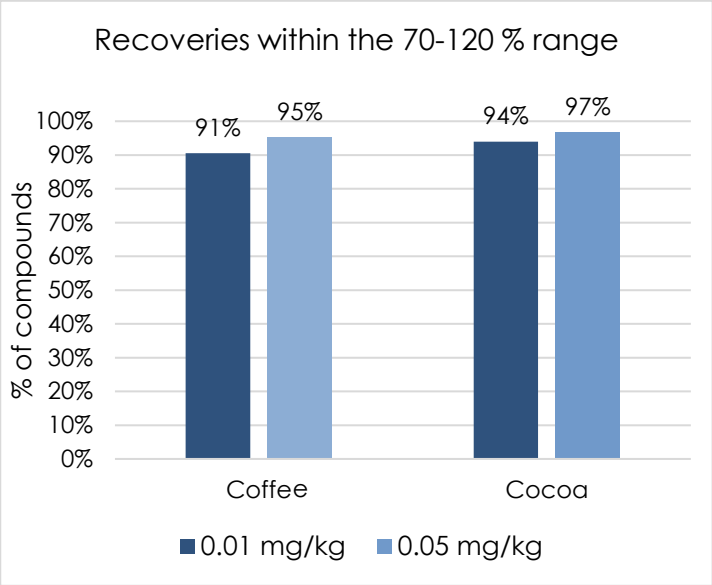
6. Results

6.1. Validation of the methods

6.1.1. Recoveries and within-laboratory reproducibility

The results corresponding to the mean recovery (n=5) and within-laboratory reproducibility in terms of relative standard deviation (RSD_r) at two fortification levels (0.01 and 0.05 mg/kg) are summarized in Appendix II, Table 3 and Table 4.

The relative standard deviation is lower than 20 % for all compounds in the five replicates. Most recovery results are within the range 70-120 %. The following graphs summarize the recovery results obtained:

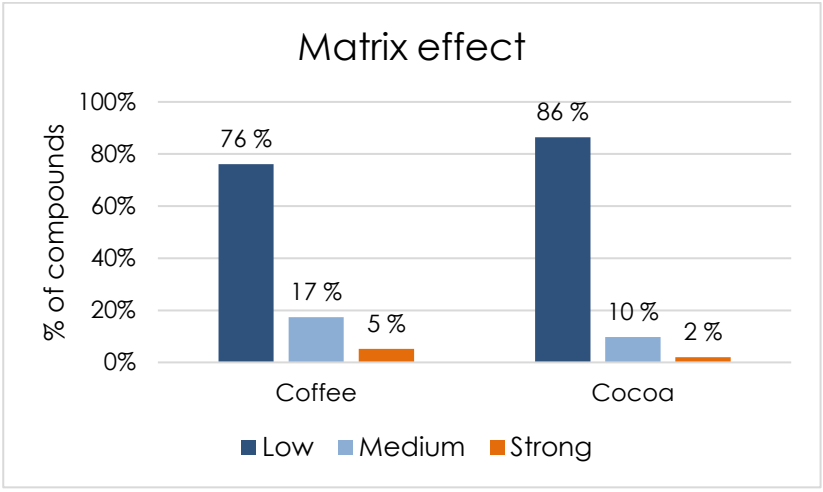


6.1.2. Linearity

Linearity of the MS/MS systems was evaluated by assessing the signal responses of the target analytes from matrix-matched calibration solutions prepared by spiking blank extracts at six concentration levels from 0.005 to 0.200 mg/L. In all cases, the coefficient of correlation (R^2) was higher than 0.99. Linearity ranges for all pesticides are summarized in Appendix II, Table 3 and Table 4.

6.1.3. Matrix effects

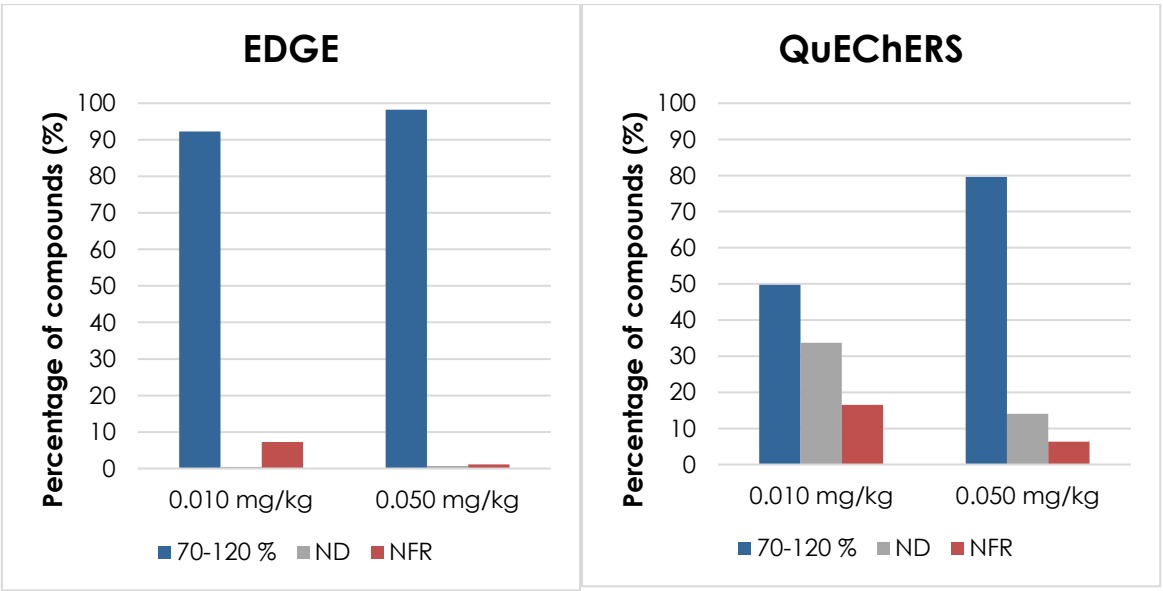
Matrix effects were assessed by comparison of the slopes of six-point matrix-matched calibration curves with the slopes of the calibration curves in solvent (LC) or in tomato (GC). For values (in absolute terms) between 0 and 20 %, matrix effect is considered low; between 20 % and 50 % there is a moderate matrix effect, and for compounds with a value over 50 % matrix effect is classified as strong. These values of matrix effects are summarized in Appendix II, Table 3 and Table 4, and they are also represented in the following graphs:



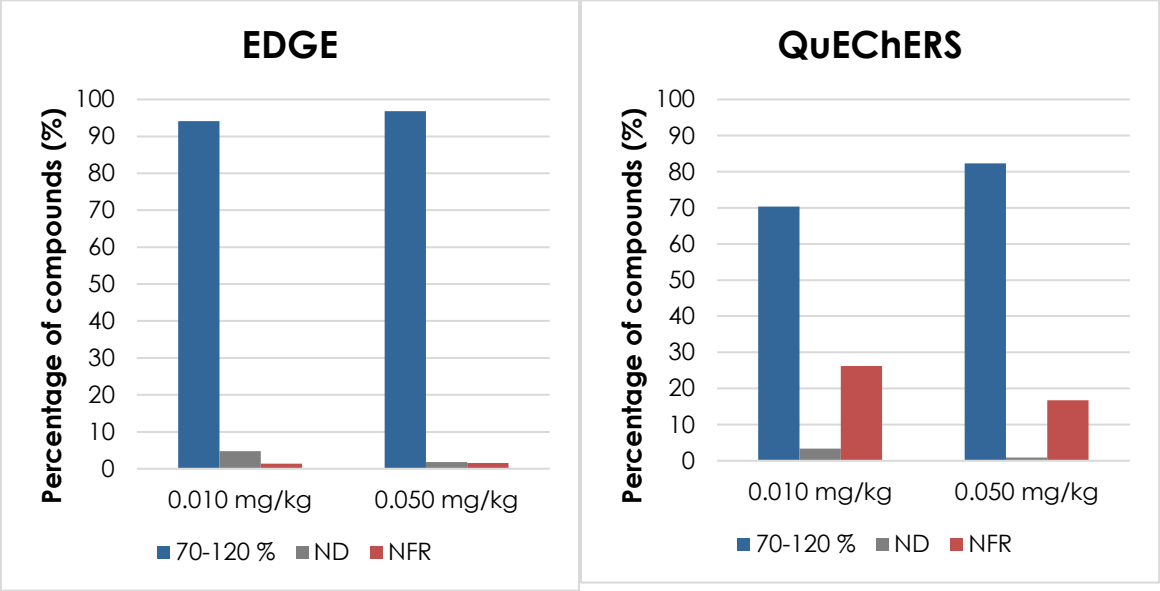
6.2. Comparison with QuEChERS method

The automatic EDGE extraction method has been compared to the QuEChERS extraction methodology in terms of recovery of the compounds included in the scope. The results of all residues included in the scope for both LC-MS/MS and GC-MS/MS are summarized in the graphs below in terms of recovery. As can be seen, the percentage of compounds with recoveries between 70 and 120 % is much higher in the EDGE-based extractions. In the QuEChERS extractions, there is a higher percentage of compounds that were not detected (ND) or that did not fulfil the requirements (NFR) for the validation.

Results for coffee



Results for cocoa



7. References

[1] COMMISSION IMPLEMENTING REGULATION (EU) 2019/533 of 28 March 2019 concerning a coordinated multiannual control programme of the Union for 2020, 2021 and 2022 to ensure compliance with maximum residue levels of pesticides and to assess the consumer exposure to pesticide residues in and on food of plant and animal origin.

[2] Working document on pesticides to be considered for inclusion in the national control programmes to ensure compliance with maximum residue levels of pesticides residues in and on food of plant and animal origin. Document N° SANCO/12745/2013.

APPENDIX I: MASS TRANSITIONS

Table 1. Detection and chromatographic parameters for the compounds analysed by LC-MS/MS.

No.	Name	t_R (min)	DP (V)	Precursor ion (m/z)	Product ion 1 (m/z)	CE 1 (eV)	Product ion 2 (m/z)	CE 2 (eV)	Polarity
1	2,4-D	6.56	-5	219.0	161.0	-20	163.0	-20	Negative
2	Avermectin b1a	11.02	41	890.0	305	35	307	29	Positive
3	Avermectin b1b	10.84	66	876.0	553	21	291	33	Positive
4	Acephate	3.44	1	184.0	143.0	13	95.0	33	Positive
5	Acetamiprid	4.63	46	223.0	126.0	27	90.0	49	Positive
6	Alachlor	8.42	26	270.0	238.1	17	162.1	29	Positive
7	Albendazole	6.92	76	266.0	234.1	27	191.0	49	Positive
8	Aldicarb	5.34	36	116.0	89.1	13	70.1	13	Positive
9	Aldicarb-sulfone	3.78	10	223.0	148.0	13	76.0	11	Positive
10	Aldicarb-sulfoxide	3.63	11	207.0	132.0	9	89.0	23	Positive
11	Ametoctradin	9.41	151	276.2	176.1	51	149.0	49	Positive
12	Anilofos	8.95	31	368.0	199.1	19	125.0	45	Positive
13	Atrazine	6.68	71	216.0	174.1	25	104.0	39	Positive
14	Azinphos-ethyl	8.08	86	345.0	132.1	25	160.0	13	Positive
15	Azinphos-methyl	7.01	1	318.0	132.1	23	77.1	51	Positive
16	Azoxystrobin	7.27	1	404.0	372.0	21	344.0	35	Positive
17	BAC10	7.88	1	276.0	91.0	53	184.2	27	Positive
18	BAC8	6.47	1	248.1	91.0	43	156.0	27	Positive
19	Benomyl	8.98	1	236.0	148.1	29	294.0	15	Positive
20	Bendiocarb	5.90	1	224.0	167.1	13	109.0	23	Positive
21	Benfuracarb	9.95	1	411.0	195.1	31	252.1	19	Positive
22	Bifenazate	8.03	91	301.0	198.0	15	17.0	29	Positive
23	Bifenthrin	11.66	56	440.0	181.1	17	165.1	103	Positive
24	Bitertanol	9.11	31	338.2	269.2	15	99.1	21	Positive
25	Boscalid	7.60	101	343.0	271.0	35	140.0	35	Positive
26	Bromacil	5.92	31	261.0	205.0	19	288.0	41	Positive
27	Bromuconazole	7.95	1	378.0	159.1	37	161.0	37	Positive
28	Bupirimate	8.28	81	317.0	166.2	33	210.1	33	Positive
29	Buprofezin	10.08	36	306.0	201.0	17	116.0	23	Positive
30	Butoxycarboxin	3.72	26	223.0	106.0	13	65.0	23	Positive
31	Carbaryl	6.08	1	202.0	145.0	17	127.0	41	Positive
32	Carbendazim	4.05	41	192.0	160.0	25	132.0	41	Positive
33	Carbofuran	5.97	21	222.0	165.0	19	123.0	31	Positive
34	Chlorantraniliprole	7.03	56	481.9	283.9	19	450.9	29	Positive
35	Chlorbromuron	7.60	41	295.0	205.9	27	182.1	25	Positive
36	Chlorfenvinphos	9.07	56	359.0	155.1	17	170.0	59	Positive
37	Chlorfluazuron	10.66	1	541.8	384.8	31	158.0	27	Positive
38	Chloridazon	4.68	81	222.0	104.0	31	91.9	33	Positive

39	Chlorotoluron	6.47	61	213.0	72.0	23	139.9	35	Positive
40	Chloroxuron	7.95	1	290.9	72.1	47	164.2	23	Positive
41	Chlorpyrifos-methyl	9.26	1	321.8	125.0	29	289.9	21	Positive
42	Chlorpyrifos	10.15	51	351.8	199.8	29	96.9	47	Positive
43	Chromafenozide	8.34	21	395.1	175.0	19	91.1	87	Positive
44	Clofentezine	8.88	76	303.0	138.0	16	102.0	51	Positive
45	Clomazone	7.21	61	240.0	124.9	27	89.1	65	Positive
46	Coumaphos	8.79	121	362.0	266.9	35	306.9	25	Positive
47	Cyazofamid	8.38	36	325.0	108.0	19	217.1	33	Positive
48	Cyflufenamid	9.31	1	413.7	296.0	21	241.0	31	Positive
49	Cyhalofop-buthyl	9.57	31	375.1	256.0	25	358.0	11	Positive
50	Cymoxanil	4.88	26	199.1	128.0	13	110.9	25	Positive
51	Cyproconazole	7.95	1	292.1	70.0	45	125.0	43	Positive
52	Cyprodinil	8.27	96	226.0	93.0	53	108.1	35	Positive
53	Cyromazine	2.50	1	167.0	83.0	29	125.1	25	Positive
54	Dazomet	4.00	31	163.0	90.0	10	120.0	10	Positive
55	DEET	6.84	1	192.0	119.1	25	91.1	39	Positive
56	Demeton-S-methylsulfone	4.03	36	262.9	168.9	21	108.9	37	Positive
57	Demeton-S-methylsulfoxide	3.93	11	246.9	169.0	19	109.1	37	Positive
58	Desthylterbuthylazine	6.17	26	201.9	146.0	23	104.0	37	Positive
59	Diazinon	9.05	1	305.0	169.0	29	153.1	29	Positive
60	Diclorvos	5.88	26	220.9	109.1	25	79.1	37	Positive
61	Dicrotophos	4.28	1	238.0	112.0	17	193.1	15	Positive
62	Diethofencarb	7.32	26	268.0	226.0	15	124.0	43	Positive
63	Difenoconazole	9.30	96	406.0	351.1	35	188.0	61	Positive
64	Difenoxuron	6.64	81	287.0	123.0	27	72.1	49	Positive
65	Dimethoate	4.74	26	230.0	199.0	13	171.0	26	Positive
66	Dimethomorph	7.43	1	388.0	301.0	29	165.0	43	Positive
67	Dmethylvinphos	8.06	26	331.0	127.0	17	169.9	57	Positive
68	Diniconazole	9.48	76	326.1	70.0	67	159.0	43	Positive
69	Dithianon	7.48	-125	295.9	264.0	-32	250.0	-50	Negative
70	DMF	5.54	71	150.0	107.0	29	106.0	43	Positive
71	DMPF	4.30	1	163.0	121.9	23	106.1	43	Positive
72	Edifenphos	8.82	36	311.0	282.9	19	109.0	45	Positive
73	Emamectin benzoate	9.77	111	886.5	158.2	41	82.2	117	Positive
74	EPN	9.38	51	323.9	296.0	19	157.0	31	Positive
75	Epoxiconazole	8.26	56	330.1	121.0	27	101.2	67	Positive
76	Ethiofencarb	6.37	31	226.0	107.1	25	164.0	11	Positive
77	Ethion	10.21	31	385.1	199.0	13	142.9	37	Positive
78	Ethiprole	7.61	111	396.9	350.9	29	255.0	49	Positive
79	Ethirimol	5.38	1	210.2	140.1	29	98.0	37	Positive
80	Ethoprophos	8.39	56	243.0	173.0	21	131.0	29	Positive
81	Etofenprox	11.39	6	394.1	177.1	19	359.1	15	Positive

82	Etoxazole	10.50	1	360.0	141.1	37	304.1	25	Positive
83	Famoxadone	8.82	51	375.0	225.1	23	319.1	23	Positive
84	Fenamidone	7.62	36	312.0	236.1	21	92.0	39	Positive
85	Fenamiphos	8.58	61	304.1	217.0	31	234.0	23	Positive
86	Fenamiphos-sulfone	5.94	91	336.0	266.0	29	308.1	21	Positive
87	Fenamiphos-sulfoxide	5.79	91	319.9	233.0	31	292.0	23	Positive
88	Fenarimol	8.27	111	331.0	268.0	33	189.1	65	Positive
89	Fenazaquin	10.81	1	307.0	161.1	23	131.2	63	Positive
90	Fenbendazole	7.73	126	299.9	268.0	33	158.9	45	Positive
91	Fenbuconazole	8.40	66	337.1	125.1	37	70.0	47	Positive
92	Fenhexamid	8.19	96	302.0	97.0	31	142.9	45	Positive
93	Fenitrothion	7.93	101	277.9	125.0	27	79.0	49	Positive
94	Fenobucarb	7.49	31	208.1	95.1	21	152.1	13	Positive
95	Fenoxycarb	8.52	36	302.2	116.2	15	88.2	31	Positive
96	Fenpropathrin	10.17	36	350.1	125.1	17	97.0	47	Positive
97	Fenpropidin	6.98	76	274.3	147.1	39	117.1	71	Positive
98	Fenpropimorph	7.27	1	304.3	147.1	39	117.1	77	Positive
99	Fenpyrazamide	8.04	1	332.0	230.1	25	231.0	17	Positive
100	Fenpyroximate	10.61	26	422.2	366.2	25	138.0	41	Positive
101	Fenthion	8.75	51	279.0	247.1	19	169.1	23	Positive
102	Fenthion sulfone	6.15	106	310.7	125.0	29	279.0	25	Positive
103	Fenthion sulfoxide	5.96	76	295.0	280.0	25	109.0	39	Positive
104	Fenuron	4.65	21	165.0	71.9	19	199.8	23	Positive
105	Fipronil	8.74	21	453.8	436.9	17	367.9	31	Positive
106	Fipronil sulfone	9.16	-35	450.7	414.9	-10	281.9	-38	Negative
107	Flazasulfuron	7.04	36	407.9	182.0	29	139.0	61	Positive
108	Flonicamid	4.12	66	230.1	202.6	25	173.9	25	Positive
109	Fluacrypyrim	9.54	16	427.0	145.1	41	204.9	15	Positive
110	Fluazifop	7.50	96	328.2	282.2	27	254.2	35	Positive
111	Flubendiamide	8.89	-65	680.9	254.0	-34	273.9	-24	Negative
112	Fludioxonil	7.67	1	265.9	228.9	19	158.0	47	Positive
113	Fluensulfone	6.66	16	291.8	165.8	25	89.1	33	Positive
114	Flufenacet	8.40	1	364.7	195.0	33	153.1	33	Positive
115	Flufenoxuron	10.46	66	489.1	158.0	25	141.1	71	Positive
116	Fluometuron	6.48	56	232.9	72.0	23	159.9	37	Positive
117	Fluopicolide	7.87	26	382.8	173.0	31	144.9	75	Positive
118	Fluopyram	8.26	61	397.0	208.0	31	173.0	41	Positive
119	Fluquinconazole	8.03	91	376.1	306.9	35	349.0	27	Positive
120	Flusilazol	8.61	71	316.1	247.1	25	165.0	37	Positive
121	Flutriafol	6.65	36	302.1	70.0	45	123.0	39	Positive
122	Fluxapyrosad	7.80	1	381.9	362.0	23	234.0	33	Positive
123	Formetanate	3.39	1	222.1	165.1	21	120.0	37	Positive
124	Fosthiazate	6.42	31	284.0	227.8	15	103.8	21	Positive
125	Haloxyfop	8.64	106	362.1	316.2	25	288.1	37	Positive

126	Hexaconazole	9.22	46	314.1	70.1	49	159.0	43	Positive
127	Hexaflumuron	9.51	66	460.8	158.0	25	140.9	71	Positive
128	Hexythiazox	10.38	41	353.1	228.2	21	168.2	35	Positive
129	Imazalil	6.32	1	297.0	159.0	31	201.0	25	Positive
130	Imidacloprid	4.36	26	256.0	209.0	23	175.0	27	Positive
131	Indoxacarb	9.55	36	527.9	249.0	23	203.0	55	Positive
132	Iprodione	8.44	16	329.9	245.1	23	288.0	21	Positive
133	Iprovalicarb	8.37	1	321.2	119.0	33	202.9	13	Positive
134	Isocarbophos	6.85	1	306.9	231.0	21	273.0	11	Positive
135	Isofenfos methyl	8.84	1	331.9	231.0	21	273.0	9	Positive
136	Isoprothiolane	7.76	21	291.0	231.0	15	188.9	27	Positive
137	Isoproturon	6.79	66	206.8	72.0	23	165.1	21	Positive
138	Isoxaflutole	7.83	1	259.9	232.0	49	184.1	45	Positive
139	Kresoxim-methyl	8.69	31	314.1	267.0	11	222.1	23	Positive
140	Lenacil	6.77	71	235.1	153.1	23	135.9	41	Positive
141	Linuron	7.43	46	249.0	160.1	33	182.0	33	Positive
142	Lufenuron	10.17	-5	508.9	325.9	-26	339.0	-26	Negative
143	Malathion	7.87	21	330.9	127.1	17	284.9	11	Positive
144	Mandipropamid	7.65	51	412.1	328.1	35	356.1	15	Positive
145	Mepanypirim	7.89	86	224.3	106.1	33	77.0	55	Positive
146	Metaflumizone	10.06	106	506.9	178.0	37	287.0	35	Positive
147	Metalaxyl	6.82	1	280.3	90.9	55	77.1	147	Positive
148	Metamitron	4.62	1	202.8	175.0	23	174.1	23	Positive
149	Metconazole	9.14	31	320.0	70.1	53	125.1	53	Positive
150	Methamidophos	3.10	31	142.1	94.1	19	125.0	19	Positive
151	Methidathion	7.01	6	302.9	145.0	11	85.1	33	Positive
152	Methiocarb	7.57	21	226.1	169.0	15	121.1	27	Positive
153	Methiocarb sulfone	4.69	16	275.0	258.0	13	122.0	31	Positive
154	Methiocarb sulfoxide	4.47	41	242.0	185.0	21	170.0	31	Positive
155	Methomyl	3.99	16	163.1	88.0	13	106.0	15	Positive
156	Methoxyfenozide	8.09	21	369.3	149.0	23	313.0	11	Positive
157	Metobromuron	6.53	16	258.9	170.0	27	148.0	21	Positive
158	Metolachlor	8.50	46	283.9	252.1	23	176.1	37	Positive
159	Metolcarb	5.55	21	166.0	109.1	19	94.0	43	Positive
160	Metrafenone	9.23	46	409.1	209.1	21	226.9	29	Positive
161	Monocrotophos	4.16	26	224.2	193.1	11	127.0	21	Positive
162	Monolinuron	6..27	36	215.0	126.0	27	99.0	65	Positive
163	Monuron	5.70	26	199.0	72.1	21	125.9	35	Positive
164	Myclobutanil	8.04	51	289.2	69.9	21	125.1	49	Positive
165	Neburon	8.75	66	274.9	88.1	21	114.1	21	Positive
166	Nitempyram	3.84	76	271.1	237.1	27	126.0	37	Positive
167	Novaluron	9.66	66	492.9	158.0	27	141.1	27	Positive
168	Omethoate	3.55	31	213.9	183.0	17	125.0	27	Positive
169	Oxadiargyl	9.17	76	340.9	223.0	25	229.9	33	Positive

170	Oxadixyl	5.36	21	279.0	219.1	17	132.2	43	Positive
171	Oxamyl	3.82	1	237.0	72.0	37	90.0	7	Positive
172	Oxasulfuron	5.40	1	407.0	150.0	15	107.1	27	Positive
173	Oxfendazole	5.31	111	316.0	159.1	43	191.1	29	Positive
174	Oxyfluorfen	9.91	51	362.0	315.9	21	237.0	37	Positive
175	Paclobutrazol	7.86	21	294.1	70.1	47	125.2	51	Positive
176	Paraoxon methyl	5.32	96	247.9	202.0	27	90.1	35	Positive
177	Penconazole	8.90	41	284.0	159.0	41	70.0	21	Positive
178	Pencycuron	9.40	96	329.1	125.1	31	89.1	91	Positive
179	Pendimethalin	10.27	1	282.1	212.1	17	194.1	25	Positive
180	Penflufen	8.78	81	318.0	234.1	23	141.0	21	Positive
181	Penthiopyrad	8.95	121	360.0	276.0	29	177.0	63	Positive
182	Permethrin	11.45	16	408.0	183.2	31	355.0	13	Positive
183	Phenthoate	8.70	51	320.9	247.0	21	135.0	37	Positive
184	Phosalone	9.15	36	367.9	182.0	19	111.0	57	Positive
185	Phosmet	7.10	36	318.0	160.0	25	133.0	49	Positive
186	Phoxim	9.09	36	298.9	129.0	17	77.1	47	Positive
187	Pirimicarb	5.64	36	239.2	182.1	23	72.2	37	Positive
188	Pirimiphos-desmethyl	4.48	1	224.8	168.1	21	72.0	35	Positive
189	Pirimiphos-methyl	9.12	116	306.2	164.2	31	108.2	39	Positive
190	Prochloraz	8.95	1	375.9	308.0	17	265.9	23	Positive
191	Profenofos	9.83	61	374.9	302.8	25	344.9	19	Positive
192	Promecarb	7.81	36	208.0	151.2	13	109.1	23	Positive
193	Prometryn	7.74	76	242.0	158.0	33	200.2	27	Positive
194	Propamocarb	3.60	36	189.2	102.1	23	144.1	19	Positive
195	Propaquizafop	9.81	96	444.0	100.2	23	371.0	23	Positive
196	Propargite	10.53	31	368.0	231.2	15	175.1	23	Positive
197	Propazine	7.52	31	230.0	187.9	25	146.1	33	Positive
198	Propiconazole	8.96	61	342.1	159.0	41	123.1	77	Positive
199	Propoxur	5.85	36	209.9	111.0	21	168.1	13	Positive
200	Propyzamide	7.90	41	256.0	191.0	21	190.	21	Positive
201	Proquinazid	10.50	41	372.9	331.0	23	288.9	33	Positive
202	Prosulfocarb	9.72	41	252.1	91.1	39	128.1	17	Positive
203	Prothioconazole	9.02	-20	341.9	306.1	-24	125.8	-32	Negative
204	Prothiofos	10.93	1	344.9	240.9	25	269.0	17	Positive
205	Pymetrozine	3.39	36	218.1	105.0	27	78.0	57	Positive
206	Pyraclostrobin	8.95	26	388.1	194.1	17	163.1	35	Positive
207	Pyrethrin	10.77	56	329.0	161.1	27	143.0	30	Positive
208	Pyridaben	10.93	46	365.0	309.1	19	147.2	33	Positive
209	Pyridalil	11.66	36	489.9	109.0	15	182.9	75	Positive
210	Pyridaphenthion	7.97	51	341.0	189.1	29	205.1	31	Positive
211	Pyridate	11.17	21	379.0	207.0	25	351.1	15	Positive
212	Pyrimethanil	7.05	101	200.0	107.0	33	183.0	33	Positive
213	Pyriofenone	9.24	116	366.0	184.0	17	209.0	41	Positive

214	Pyriproxyfen	10.0	36	322.0	96.0	21	185.0	33	Positive
215	Quinalphos	8.55	36	298.9	242.9	15	162.9	31	Positive
216	Quinoclamine	5.45	61	207.9	105.1	33	89.2	55	Positive
217	Quinoxyfen	10.10	146	308.1	197.0	45	162.0	61	Positive
218	Quizalofos	8.25	91	344.9	299.0	27	244.0	37	Positive
219	Quizalofos-ethyl	9.64	111	373.0	299.0	27	271.0	35	Positive
220	Rotenone	8..29	111	395.0	213.0	31	192.0	33	Positive
221	Simazine	5.82	91	201.9	132.1	27	124.2	27	Positive
222	Spinetoram	9.37	51	748.3	142.1	23	98.1	51	Positive
223	Spinosyn A	8.98	1	732.2	142.1	35	98.2	97	Positive
224	Spinosyn D	9.32	111	746.2	142.0	35	98.2	73	Positive
225	Spirodiclofen	10.84	36	410.9	313.0	17	71.1	35	Positive
226	Spiromesifen	10.67	31	371.0	273.0	17	255.0	33	Positive
227	Spirotetramat	8.19	21	374.2	302.2	25	330.3	21	Positive
228	Spiroxamine	7.55	1	298.0	144.0	29	100.0	45	Positive
229	Sulfoxaflor	4.82	41	294.7	173.9	27	154.0	47	Positive
230	Tebuconazole	8.89	71	308.0	70.0	53	125.0	53	Positive
231	Tebufenozide	8.83	16	353.2	133.1	27	297.1	13	Positive
232	Tebufenpyrad	9.98	131	334.1	145.0	37	147.1	35	Positive
233	Teflubenzuron	9.97	-5	379.0	338.7	-16	195.8	-32	Negative
234	Terbuthylazine	7.66	1	230.0	174.0	23	103.9	45	Positive
235	Terbutryn	7.82	41	242.1	186.1	27	91.1	37	Positive
236	Tetraconazole	8.39	11	372.0	159.0	41	123.0	87	Positive
237	Thiabendazol	4.34	121	202.0	175.0	37	131.0	45	Positive
238	Thiacloprid	4.86	51	253.0	126.0	29	90.0	53	Positive
239	Thiamethoxam	4.05	36	292.0	211.0	19	181.0	33	Positive
240	Thiobencarb	9.24	36	258.0	125.1	29	89.0	71	Positive
241	Tolclofos-methyl	9.03	96	301.1	268.9	23	125.1	23	Positive
242	Tolfenpyrad	9.86	166	385.5	197.0	35	154.0	61	Positive
243	Triadimenol	8.24	1	296.0	70.0	37	227.0	13	Positive
244	Triallate	10.43	56	303.7	142.9	41	86.1	21	Positive
245	Triazophos	8.01	46	314.1	162.1	25	119.0	53	Positive
246	Triclorcarban	9.47	91	314.9	127.0	45	162.0	27	Positive
247	Tricyclazole	5.00	106	189.9	163.0	31	136.0	39	Positive
248	Trifloxystrobin	9.62	36	408.9	186.1	25	145.0	69	Positive
249	Triflumizole	9.75	21	345.9	278.0	15	73.1	21	Positive
250	Triflumuron	9.11	-45	359.0	153.0	-18	84.9	-60	Negative
251	Triticonazole	8.22	46	317.9	70.1	55	124.9	59	Positive
252	Tritosulfuron	7.19	26	445.9	195.0	19	221.0	25	Positive
253	Vinclozolin	9.34	141	285.9	242.0	31	194.1	43	Positive
254	XMC	5.99	31	179.9	123.0	17	95.0	29	Positive
255	Zoxamide	9.03	56	335.9	186.9	31	159.0	57	Positive

t_R: retention time
CE: collision energy

Table 2. Acquisition and chromatographic parameters for the compounds analysed by GC-MS/MS.

No.	Name	tR (min)	Precursor ion 1 (m/z)	Product ion 1 (m/z)	CE 1 (eV)	Precursor ion 2 (m/z)	Product ion 2 (m/z)	CE 2 (eV)
1	2,4'-DDE	7.24	246.0	211.0	20	246.0	176.0	30
2	4,4'-DDD	7.95	235.0	199.0	15	235.0	165.0	20
3	4,4'-DDE	7.53	246.0	211.0	20	246.0	176.0	30
4	4,4'-DDT	8.30	235.0	199.0	20	235.0	165.0	20
5	Acrinathrin	9.31	289.0	93.0	5	208.0	181.0	5
6	Alachlor	6.24	188.0	160.0	10	188.0	130.0	40
7	Ametryn	6.24	227.0	212.0	8	227.0	185.0	5
8	Anthraquinone	6.69	208.0	180.0	5	208.0	152.0	20
9	Atrazine	5.49	215.0	173.0	5	215.0	58.0	10
10	Azoxystrobin	11.98	344.0	329.0	10	344.0	156.0	40
11	Benalaxyl	8.21	204.0	176.0	2	148.0	105.0	20
12	Bifenox	8.94	311.0	279.0	14	311.0	216.0	25
13	Bifenthrin	8.72	181.0	166.0	10	181.0	115.0	50
14	Biphenyl	3.96	154.0	126.0	40	154.0	102.0	40
15	Bixafen	10.69	413.0	159.0	12	159.0	139.0	15
16	Boscalid	10.43	140.0	112.0	10	140.0	76.0	25
17	Bromopropylate	8.77	341.0	185.0	20	341.0	155.0	20
18	Bupirimate	7.62	273.0	193.0	5	273.0	108.0	15
19	Buprofezin	7.61	305.0	172.0	5	172.0	57.0	15
20	Butralin	6.76	266.0	190.0	12	266.0	174.0	20
21	Butylate	4.08	156.0	57.0	5	146.0	57.0	10
22	Cadusafos	5.20	159.0	131.0	5	158.8	97.0	15
23	Captan	7.09	149.0	105.0	5	116.9	81.9	40
24	Carbofuran	5.45	164.0	149.0	12	164.0	122.0	12
25	Carbophenothion	8.19	342.0	157.0	10	199.0	143.0	10
26	Carbosulfan	8.54	160.0	104.0	5	118.0	76.0	5
27	Chinomethionate	7.30	234.0	206.0	10	206.0	148.0	15
28	Chlorbromuron	4.06	233.0	205.0	12	233.0	124.0	25
29	Chlordane	7.29	373.0	301.0	10	373.0	266.0	20
30	Chlorfenapyr	7.76	247.0	227.0	15	247.0	200.0	25
31	Chlorfenvinphos	7.02	294.9	266.9	5	267.0	81.0	40
32	Chlorfluazuron	7.36	321.0	304.0	30	321.0	286.0	30
33	Chlorobenzilate	7.83	139.0	111.0	15	139.0	75.0	30
34	Chlorothalonil	5.93	266.0	231.0	20	266.0	133.0	40
35	Chlorpropham	5.02	213.0	171.0	5	213.0	127.0	5
36	Chlorpyrifos	6.62	314.0	286.0	5	314.0	258.0	15
37	Chlorpyrifos-methyl	6.18	288.0	93.0	26	286.0	271.0	16
38	Chlorthal-dimethyl	6.68	330.0	299.0	12	330.0	221.0	35
39	Chlozolinate	6.96	331.0	216.0	5	259.0	188.0	10

40	Coumaphos	9.90	362.0	226.0	10	362.0	109.0	15
41	Cyflufenamid	8.00	118.1	90.0	10	118.1	89.0	25
42	Cyfluthrin	10.10	226.0	206.0	10	163.0	127.0	5
43	Cypermethrin	10.32	165.0	127.0	5	163.0	127.0	5
44	Cyproconazole	7.80	222.0	125.0	18	139.0	111.0	14
45	Cyprodinil	6.88	224.0	208.0	20	224.0	197.0	21
46	Deltamethrin	11.63	253.0	172.0	5	253.0	93.0	20
47	Diazinon	5.67	304.0	179.0	15	137.0	84.0	15
48	Dichlofluanid	6.53	224.0	123.0	8	167.0	124.0	5
49	Dichloran	5.50	206.0	176.0	5	206.0	124.0	25
50	Dichlorvos	3.44	185.0	109.0	15	185.0	93.0	15
51	Dichlorvos-D_6	3.43	191.0	115.0	20	191.0	99.0	15
52	Diclobutrazol	7.68	270.0	201.0	8	270.0	159.0	15
53	Dicofol, o, p'-	8.42	251.0	139.0	15	139.0	111.0	15
54	Dicofol, p, p'-	7.83	251.0	139.0	15	139.0	111.0	15
55	Dieldrin	7.62	345.0	263.0	8	279.0	243.0	8
56	Diethofencarb	6.52	207.0	151.0	10	151.0	123.0	10
57	Dimethenamid	6.12	232.1	154.0	5	230.0	154.0	10
58	Dimethipin	5.54	124.0	76.0	5	118.0	58.0	10
59	Diphenylamine	4.96	169.0	77.0	35	168.0	140.0	40
60	Disulfoton	5.60	142.0	109.0	5	142.0	81.0	12
61	Dodemorph	6.77	281.0	154.0	15	154.0	82.0	20
62	Endosulfan sulfate	8.33	387.0	289.0	5	272.0	237.0	15
63	Endosulfan-alpha	7.37	241.0	206.0	10	195.0	160.0	5
64	Endosulfan-beta	7.93	240.9	205.9	10	207.0	172.0	15
65	Endrin	7.84	263.0	193.0	35	245.0	173.0	30
66	EPN	8.79	157.0	110.0	15	157.0	77.0	25
67	Epoxiconazole	8.61	192.0	138.0	10	192.0	111.0	35
68	Ethion	7.95	231.0	175.0	5	231.0	129.0	25
69	Ethofumesate	6.44	207.0	161.0	5	207.0	137.0	10
70	Ethoprophos	4.96	158.0	114.0	5	158.0	97.0	15
71	Etofenprox	10.47	163.0	135.0	5	163.0	107.0	15
72	Etrimfos	5.83	292.0	181.0	5	292.0	153.0	20
73	Fenamidone	8.90	268.0	180.0	20	238.0	103.0	20
74	Fenarimol	9.44	219.0	107.0	10	139.0	111.0	15
75	Fenazaquin	8.92	160.0	145.0	5	145.0	117.0	10
76	Fenbuconazole	10.18	198.0	129.0	5	129.0	102.0	15
77	Fenchlorphos	6.32	285.0	270.0	15	285.0	240.0	30
78	Fenhexamid	8.33	177.0	113.0	10	177.0	78.0	20
79	Fenitrothion	6.44	277.0	260.0	5	277.0	109.0	20
80	Fenpropathrin	8.81	265.0	210.0	10	265.0	89.0	30
81	Fenpropidin	6.35	273.0	98.0	3	98.0	55.0	12
82	Fenpropimorph	6.58	128.0	110.0	10	128.0	70.0	12
83	Fenthion	6.61	278.0	169.0	20	278.0	109.0	20

84	Fenvalerate	10.98	167.0	125.0	12	125.0	89.0	20
85	Fipronil	7.04	369.0	215.0	30	367.0	213.0	30
86	Flamprop-isopropyl	7.88	276.0	105.0	5	276.0	77.0	40
87	Flamprop-methyl	7.58	276.0	105.0	8	230.0	170.0	15
88	Fluacrypyrim	8.00	320.0	183.0	10	145.0	102.0	30
89	Fluazifop-p-butyl	7.70	282.0	238.0	20	282.0	91.0	15
90	Flucythrinate	10.42	199.0	157.0	5	157.0	107.0	15
91	Fludioxonil	7.62	248.0	154.0	25	248.0	127.0	30
92	Fluopicolide	8.33	209.0	182.0	20	173.0	109.0	25
93	Fluopyram	7.00	223.0	196.0	15	173.0	145.0	15
94	Fluquinconazole	9.89	340.0	298.0	20	340.0	286.0	30
95	Flusilazole	7.62	233.0	165.0	20	233.0	152.0	20
96	Flutolanil	7.41	323.0	281.0	5	323.0	173.0	15
97	Flutriafol	7.40	219.0	123.0	12	219.0	95.0	20
98	Fluvalinate-tau	11.11	250.0	200.0	20	250.0	55.0	15
99	Folpet	7.16	260.0	130.0	15	147.0	76.0	25
100	Fonofos	5.68	246.0	137.0	5	137.0	109.0	5
101	Formothion	6.00	224.0	125.0	20	170.0	93.0	5
102	Fosthiazate	6.83	195.0	139.0	5	195.0	103.0	5
103	HCB	5.42	284.0	249.0	25	284.0	214.0	40
104	Heptachlor	6.30	272.0	237.0	10	272.0	143.0	40
105	Heptenophos	4.71	126.0	89.0	10	124.0	89.0	15
106	Hexaconazole	7.46	214.0	172.0	20	214.0	159.0	20
107	Indoxacarb	11.53	264.0	148.0	25	203.0	134.0	10
108	Iprodione	8.59	244.0	187.0	5	187.0	124.0	25
109	Iprovalicarb	7.52	158.0	116.0	5	158.0	98.0	10
110	Isazofos	5.82	257.0	162.0	5	161.0	119.0	5
111	Isocarbophos	6.87	230.0	212.0	8	136.0	108.0	15
112	Isofenphos	7.00	213.0	185.0	3	213.0	121.0	15
113	Isofenphos-methyl	6.87	199.0	167.0	10	199.0	121.0	10
114	Isoprothiolane	7.47	162.0	134.0	5	162.0	85.0	15
115	Isopyrazam	9.55	359.0	303.0	8	159.0	139.0	10
116	Kresoxim-methyl	7.61	206.0	131.0	10	206.0	116.0	5
117	Lambda-Cyhalothrin	9.25	197.0	161.0	5	197.0	141.0	10
118	Lindane	5.64	219.0	183.0	5	219.0	145.0	25
119	Lindane-D_6	5.61	224.0	187.0	5	224.0	150.0	20
120	Malathion	6.49	173.0	99.0	15	158.0	125.0	8
121	Malathion-D_{10}	6.45	183.0	151.0	3	183.0	132.0	5
122	Mecarbam	7.00	329.0	160.0	3	131.0	74.0	15
123	Mepanipyrim	7.31	222.0	207.0	30	222.0	158.0	30
124	Merphos	7.51	169.0	113.0	3	169.0	57.0	8
125	Metalaxyl	6.29	206.0	162.0	8	206.0	132.0	20
126	Metazachlor	6.96	209.0	133.0	10	133.0	117.0	25
127	Metconazole	8.98	125.0	99.0	20	125.0	89.0	20

128	Methidathion	7.22	145.0	85.0	5	145.0	58.0	15
129	Methiocarb	6.44	168.0	153.0	10	153.0	109.0	10
130	Methoxychlor, o,p'-	8.42	227.0	169.0	25	227.0	115.0	40
131	Methoxychlor, p,p'-	8.82	227.0	169.0	25	227.0	115.0	40
132	Metolachlor	6.60	238.0	162.0	8	162.0	133.0	10
133	Mevinphos	4.08	127.0	109.0	10	127.0	95.0	15
134	Molinate	4.58	187.0	126.0	3	126.0	55.0	12
135	Myclobutanil	7.62	179.0	152.0	5	179.0	125.0	10
136	Napropamide	7.43	271.0	128.0	3	128.0	72.0	3
137	Novaluron	3.49	335.0	168.0	35	168.0	139.9	10
138	Nuarimol	8.46	235.0	139.0	12	203.0	107.0	10
139	Ofurace	7.95	232.0	186.0	5	232.0	158.0	20
140	Oxadixyl	8.00	163.0	132.0	15	163.0	117.0	25
141	Paclobutrazol	7.28	236.0	132.0	15	236.0	125.0	10
142	Parathion	6.64	291.0	109.0	10	139.0	109.0	10
143	Parathion-methyl	6.20	263.0	109.0	10	233.0	124.0	10
144	Pebulate	4.20	161.0	128.0	3	128.0	57.0	5
145	Penconazole	6.97	248.0	192.0	15	248.0	157.0	25
146	Pendimethalin	6.93	252.0	191.0	10	252.0	162.0	10
147	Penthiopyrad	7.94	302.0	177.0	20	177.0	101.0	20
148	Permethrin	9.69	183.0	153.0	15	163.0	127.0	5
149	Phenothrin	8.98	183.0	168.0	15	183.0	153.0	15
150	Phenthoate	7.05	274.0	246.0	5	274.0	121.0	10
151	Phorate	5.24	231.0	175.0	20	231.0	129.0	20
152	Phosmet	8.81	160.0	133.0	15	160.0	77.0	30
153	Phthalimide	4.35	147.0	103.0	5	147.0	76.0	30
154	Picolinafen	8.78	376.0	238.0	25	238.0	145.0	25
155	Picoxystrobin	7.32	335.0	173.0	10	303.0	157.0	15
156	Pirimicarb	5.94	238.0	166.0	10	166.0	96.0	20
157	Pirimiphos-methyl	6.41	305.0	180.0	5	290.0	151.0	15
158	Procymidone	7.12	283.0	255.0	8	283.0	96.0	8
159	Profenofos	7.50	337.0	309.0	5	337.0	267.0	15
160	Prometon	5.42	225.0	183.0	3	225.0	168.0	10
161	Prometryn	6.26	241.0	226.0	8	241.0	184.0	12
162	Propaphos	7.17	220.0	140.0	12	220.0	125.0	25
163	Propazine	5.51	229.0	58.0	10	214.0	172.0	8
164	Propiconazole	8.25	259.0	191.0	8	259.0	173.0	10
165	Propyzamide	5.65	173.0	145.0	15	173.0	109.0	30
166	Prosulfocarb	6.32	251.0	128.0	5	128.0	86.0	3
167	Prothiofos	7.46	309.0	239.0	15	309.0	221.0	25
168	Pyraclostrobin	11.15	164.0	132.0	10	132.0	77.0	20
169	Pyrazophos	9.42	232.0	204.0	5	221.0	193.0	10
170	Pyridaben	9.82	147.0	132.0	10	147.0	117.0	20
171	Pyrifenox	7.24	262.0	227.0	10	262.0	200.0	20

172	Pyrimethanil	5.72	198.0	156.0	25	198.0	118.0	25
173	Pyriofenone	8.62	365.0	350.0	5	350.0	320.0	5
174	Pyriproxyfen	9.13	136.0	96.0	10	136.0	78.0	20
175	Quinalphos	7.05	157.0	129.0	15	146.0	91.0	30
176	Quinoxyfen	8.26	307.0	272.0	5	307.0	237.0	25
177	Quintozene	5.68	295.0	265.0	10	295.0	237.0	15
178	Secbumeton	5.78	225.0	196.0	5	225.0	169.0	5
179	Spirodiclofen	9.74	312.0	259.0	10	312.0	109.0	20
180	Spiromesifen	8.64	272.0	254.0	3	272.0	209.0	12
181	Sulfotep	5.16	238.0	146.0	10	202.0	146.0	10
182	Sulprofos	8.08	322.0	156.0	10	156.0	141.0	15
183	Tebuconazole	8.45	250.0	153.0	12	250.0	125.0	20
184	Tebufenpyrad	8.85	333.0	276.0	5	333.0	171.0	20
185	Tecnazene	4.90	215.0	179.0	10	203.0	143.0	20
186	Tefluthrin	5.74	177.0	137.0	15	177.0	127.0	15
187	Terbufos	5.62	231.0	175.0	10	231.0	129.0	25
188	Terbumeton	5.53	225.0	169.0	3	169.0	154.0	5
189	Terbutryn	6.39	241.0	185.0	3	241.0	170.0	10
190	Tetrachlorvinphos	7.28	329.0	109.0	25	329.0	79.0	35
191	Tetraconazole	6.69	336.0	218.0	30	336.0	204.0	30
192	Tetradifon	9.06	356.0	229.0	10	356.0	159.0	10
193	Tetrahydrophthalimide	4.35	151.0	136.0	8	151.0	122.0	8
194	Tetramethrin	8.74	164.0	107.0	15	164.0	77.0	30
195	Thiobencarb	6.54	125.0	89.0	15	100.0	72.0	3
196	Tolclofos-methyl	6.24	265.0	250.0	15	265.0	220.0	25
197	Tolylfluanid	7.01	240.0	137.0	10	238.0	137.0	10
198	Triadimefon	6.66	208.0	181.0	5	208.0	127.0	15
199	Triallate	5.85	268.0	184.0	20	143.0	83.0	15
200	Triazophos	8.10	161.0	134.0	5	161.0	106.0	10
201	Trifloxystrobin	8.20	222.0	190.0	3	222.0	130.0	15
202	Trifluralin	5.07	306.0	264.0	10	264.0	160.0	15
203	Triphenyl phosphate	8.47	326.0	233.0	10	326.0	169.0	35
204	Vinclozolin	6.17	212.0	172.0	15	212.0	109.0	40

t_R: Retention time
CE: collision energy

APPENDIX II: VALIDATION RESULTS

Table 3. Accuracy data (as % recovery) and precision data (as repeatability RSD_r, n=5) at 0.010 and 0.050 mg/kg, linearity range and matrix effects for coffee samples and automatic extraction method.

No.	Name	Recov. 0.010 mg/kg (RSD) (%)	Recov. 0.050 mg/kg (RSD) (%)	Linear range (mg/kg)	Matrix effect (%)	Analytical technique
1	2,4'-DDE	100 (9)	111 (3)	0.005-0.2	-1	GC
2	2.4 D	76 (18)	76 (6)	0.005-0.2	307	LC
3	4,4'-DDD	109 (7)	112 (1)	0.005-0.2	15	GC
4	4,4'-DDE	99 (13)	107 (3)	0.005-0.2	-2	GC
5	4,4'-DDT	102 (4)	113 (7)	0.010-0.2	-51	GC
6	Abamectin	120 (6)	118 (11)	0.005-0.2	33	LC
7	Acephate	107 (7)	109 (5)	0.005-0.2	-12	LC
8	Acetamiprid	114 (9)	120 (5)	0.005-0.2	-17	LC
9	Acrinathrin	78 (10)	115 (8)	0.005-0.2	11	GC
10	Alachlor	106 (1)	118 (2)	0.005-0.2	-5	LC
11	Alachlor	77 (9)	115 (2)	0.010-0.2	12	GC
12	Albendazole	121 (7)	112 (4)	0.005-0.2	-19	LC
13	Aldicarb	117 (10)	120 (2)	0.005-0.2	-13	LC
14	Aldicarb sulfone	118 (7)	112 (4)	0.005-0.2	-14	LC
15	Aldicarb sulfoxide	113 (8)	107 (4)	0.005-0.2	-11	LC
16	Ametoctradin	118 (4)	117 (3)	0.005-0.2	-6	LC
17	Ametryn	88 (9)	109 (3)	0.010-0.2	19	GC
18	Anilofos	120 (3)	117 (3)	0.005-0.2	2	LC
19	Anthraquinone	117 (6)	111 (2)	0.005-0.2	41	GC
20	Atrazine	119 (5)	112 (3)	0.005-0.2	-18	LC
21	Atrazine	111 (8)	116 (2)	0.005-0.2	15	GC
22	Azinphos methyl	110 (9)	115 (2)	0.005-0.2	2	LC
23	Azinphos-ethyl	117 (8)	118 (8)	0.005-0.2	13	LC
24	Azoxystrobin	116 (6)	114 (3)	0.005-0.2	1	LC
25	Azoxystrobin	118 (6)	114 (0)	0.010-0.2	13	GC
26	BAC10	96 (18)	96 (2)	0.005-0.2	0	LC
27	BAC8	94 (13)	90 (6)	0.005-0.2	-5	LC
28	Benalaxyl	121 (7)	116 (6)	0.005-0.2	-3	LC
29	Benalaxyl	119 (11)	117 (2)	0.010-0.2	-1	GC
30	Bendiocarb	117 (8)	114 (2)	0.005-0.2	-12	LC
31	Benfuracarb*					LC
32	Bifenazate	113 (3)	113 (4)	0.005-0.2	-8	LC
33	Bifenox	113 (10)	110 (3)	0.010-0.2	-17	GC
34	Bifenthrin	117 (5)	120 (3)	0.005-0.2	-10	LC
35	Bifenthrin	102 (8)	112 (1)	0.005-0.2	4	GC
36	Biphenyl	98 (5)	113 (2)	0.005-0.2	2	GC

37	Bitertanol	108 (9)	116 (5)	0.005-0.2	8	LC
38	Bixafen	112 (8)	95 (1)	0.005-0.2	12	GC
39	Boscalid	120 (3)	121 (6)	0.005-0.2	8	LC
40	Boscalid	111 (9)	109 (3)	0.005-0.2	4	GC
41	Bromacil	118 (6)	113 (4)	0.005-0.2	-24	LC
42	Bromopropylate	109 (9)	116 (2)	0.005-0.2	19	GC
43	Bromuconazole	115 (15)	115 (4)	0.005-0.2	-2	LC
44	Bupirimate	112 (8)	111 (3)	0.005-0.2	-2	LC
45	Bupirimate	113 (7)	111 (1)	0.005-0.2	11	GC
46	Buprofezin	112 (6)	114 (5)	0.005-0.2	-4	LC
47	Buprofezin	117 (5)	111 (2)	0.010-0.2	14	GC
48	Butoxycarboxim	115 (9)	109 (2)	0.005-0.2	-16	LC
49	Butralin	115 (10)	117 (3)	0.005-0.2	52	GC
50	Butylate	111 (8)	114 (2)	0.005-0.2	9	GC
51	Cadusafos	113 (8)	120 (1)	0.005-0.2	15	GC
52	Captan + tetrahydrophthalimide	86 (15)	82 (14)	0.005-0.2	5	GC
53	Carbaryl	116 (10)	119 (4)	0.005-0.2	-9	LC
54	Carbendazim	107 (9)	108 (3)	0.005-0.2	-42	LC
55	Carbofuran	116 (10)	108 (8)	0.005-0.2	6	LC
56	Carbofuran + carbosulfan	ND	115 (4)	0.020-0.2	69	GC
57	Carbophenothion	106 (10)	114 (3)	0.005-0.2	13	GC
58	Chinomethionate	100 (14)	111 (4)	0.010-0.2	18	GC
59	chlorantraniliprole	120 (3)	120 (3)	0.005-0.2	11	LC
60	Chlorbromuron	114 (7)	116 (4)	0.005-0.2	-3	LC
61	Chlorbromuron	113 (9)	117 (4)	0.005-0.2	-6	GC
62	Chlordane	ND	112 (7)	0.020-0.2	14	GC
63	Chlorfenapyr	111 (7)	117 (3)	0.010-0.2	3	GC
64	Chlorfenvinphos	118 (4)	112 (4)	0.005-0.2	-3	LC
65	Chlorfenvinphos	90 (13)	113 (2)	0.005-0.2	34	GC
66	Chlorfluazuron	114 (6)	120 (3)	0.005-0.2	15	LC
67	Chloridazon	107 (10)	111 (4)	0.005-0.2	-24	LC
68	Chlorobenzilate	106 (4)	116 (1)	0.005-0.2	49	GC
69	Chlorothalonil	71 (14)	93 (0)	0.005-0.2	33	GC
70	Chlorotoluron	116 (4)	115 (5)	0.005-0.2	-13	LC
71	Chloroxuron	115 (7)	116 (1)	0.005-0.2	-8	LC
72	Chlorpropham	113 (13)	119 (1)	0.005-0.2	16	GC
73	Chlorpyrifos	118 (9)	119 (1)	0.005-0.2	9	GC
74	Chlorpyrifos methyl	117 (15)	116 (3)	0.010-0.2	5	LC
75	Chlorpyrifos-methyl	107 (12)	118 (3)	0.005-0.2	5	GC
76	Chlorpyriphos	120 (8)	115 (7)	0.005-0.2	6	LC
77	Chlorthal-dimethyl	112 (8)	117 (2)	0.005-0.2	7	GC
78	Chlozolinate	117 (5)	113 (4)	0.010-0.2	12	GC
79	Chromafenozide	119 (4)	115 (5)	0.005-0.2	0	LC
80	Clofentezine	112 (8)	116 (4)	0.005-0.2	23	LC

81	Clomazone	116 (5)	115 (3)	0.005-0.2	-4	LC
82	Coumaphos	113 (7)	117 (3)	0.005-0.2	6	LC
83	Coumaphos	111 (8)	116 (1)	0.005-0.2	16	GC
84	Cyazofamid	120 (11)	120 (7)	0.010-0.2	1	LC
85	Cyflufenamid	115 (17)	119 (1)	0.005-0.2	4	LC
86	Cyfluthrin	112 (15)	115 (1)	0.005-0.2	19	GC
87	Cyhalofop-buthyl	117 (11)	114 (5)	0.005-0.2	2	LC
88	Cymoxanil	116 (10)	120 (1)	0.005-0.2	-13	LC
89	Cypermethrin	118 (12)	109 (3)	0.010-0.2	28	GC
90	Cyproconazole	105 (9)	112 (2)	0.005-0.2	53	GC
91	Cyproconazole	114 (5)	115 (6)	0.005-0.2	-1	LC
92	Cyprodinil	112 (7)	115 (6)	0.005-0.2	-5	LC
93	Cyprodinil	109 (8)	114 (3)	0.005-0.2	20	GC
94	Cyromazine	ND	33 (12)	0.010-0.2	-6	LC
95	Dazomet	ND	95 (5)	0.020-0.2	-14	LC
96	DEET	114 (5)	121 (3)	0.005-0.2	-1	LC
97	Deltamethrin	117 (4)	113 (2)	0.010-0.2	8	GC
98	Demeton-S-methylsulfone	108 (8)	113 (2)	0.005-0.2	-44	LC
99	Demeton-S-methylsulfoxide	98 (7)	101 (7)	0.005-0.2	-8	LC
100	Desethylterbuthylazine	119 (4)	114 (3)	0.005-0.2	-28	LC
101	Diazinon	115 (3)	119 (4)	0.005-0.2	-3	LC
102	Diazinon	111 (11)	117 (2)	0.005-0.2	11	GC
103	Dichlofluanid	88 (17)	115 (2)	0.005-0.2	14	GC
104	Dichloran	106 (9)	118 (1)	0.005-0.2	33	GC
105	Dichlorvos	ND	117 (2)	0.05-0.2	-10	LC
106	Dichlorvos	109 (8)	116 (2)	0.005-0.2	14	GC
107	Diclobutrazol	108 (11)	117 (1)	0.005-0.2	37	GC
108	Dicofol, o, p'-	96 (3)	92 (3)	0.005-0.2	-37	GC
109	Dicofol, p, p'-	109 (10)	114 (3)	0.005-0.2	53	GC
110	Dicrotophos	105 (8)	106 (3)	0.005-0.2	-13	LC
111	Dieldrin	112 (6)	109 (8)	0.010-0.2	-11	GC
112	Diethofencarb	119 (7)	118 (3)	0.005-0.2	0	LC
113	Difenoconazole	114 (11)	119 (4)	0.005-0.2	30	LC
114	Difenoxuron	113 (3)	120 (1)	0.005-0.2	-2	LC
115	Dimethenamid	120 (8)	117 (3)	0.005-0.2	-75	GC
116	Dimethipin	91 (16)	115 (4)	0.010-0.2	18	GC
117	Dimethoate	114 (9)	111 (3)	0.005-0.2	-118	LC
118	Dimethomorph	108 (7)	121 (5)	0.005-0.2	10	LC
119	Dimethylvinphos	121 (11)	121 (4)	0.005-0.2	-4	LC
120	Diniconazole	115 (11)	111 (2)	0.010-0.2	15	LC
121	Diphenylamine	114 (6)	116 (1)	0.010-0.2	7	GC
122	Disulfoton	ND	117 (7)	0.020-0.2	211	GC
123	Dithianon	ND	36 (20)	0.05-0.2	-78	LC
124	DMF	111 (6)	119 (3)	0.005-0.2	-16	LC

125	DMPF	113 (4)	107 (10)	0.005-0.2	7	LC
126	Dodemorph	ND	73 (10)	0.020-0.2	-17	GC
127	Edifenphos	119 (7)	114 (1)	0.005-0.2	2	LC
128	emamectin	74 (15)	73 (2)	0.005-0.2	7	LC
129	Endosulfan sulfate	111 (11)	118 (1)	0.005-0.2	-8	GC
130	Endosulfan-alpha	95 (6)	111 (2)	0.005-0.2	-2	GC
131	Endosulfan-beta	116 (3)	117 (3)	0.010-0.2	-13	GC
132	Endrin	ND	113 (3)	0.020-0.2	10	GC
133	EPN	112 (11)	111 (7)	0.005-0.2	-6	LC
134	EPN	112 (10)	116 (3)	0.005-0.2	35	GC
135	Epoxiconazole	104 (5)	121 (1)	0.005-0.2	2	LC
136	Epoxiconazole	109 (9)	117 (1)	0.005-0.2	16	GC
137	Ethiofencarb	100 (11)	119 (5)	0.005-0.2	-18	LC
138	Ethion	120 (5)	118 (4)	0.005-0.2	20	LC
139	Ethion	111 (9)	119 (2)	0.005-0.2	30	GC
140	Ethiprole	116 (10)	118 (5)	0.005-0.2	2	LC
141	Ethirimol	70 (15)	79 (4)	0.005-0.2	-16	LC
142	Ethofumesate	121 (5)	113 (2)	0.005-0.2	11	GC
143	Ethoprophos	113 (5)	117 (2)	0.005-0.2	-8	LC
144	Ethoprophos	115 (7)	120 (1)	0.005-0.2	21	GC
145	Etofenprox	113 (7)	121 (2)	0.005-0.2	-14	LC
146	Etofenprox	107 (14)	105 (2)	0.005-0.2	-4	GC
147	Etoxazole	116 (7)	121 (5)	0.005-0.2	0	LC
148	Etrimfos	113 (8)	119 (2)	0.005-0.2	9	GC
149	Famoxadone	ND	101 (19)	0.050-0.2	-37	LC
150	Fenamidone	112 (6)	111 (3)	0.005-0.2	6	LC
151	Fenamidone	ND	111 (3)	0.020-0.2	-25	GC
152	Fenamiphos	115 (8)	113 (2)	0.005-0.2	2	LC
153	Fenamiphos - sulfone	115 (6)	118 (3)	0.005-0.2	8	LC
154	Fenamiphos - sulfoxide	106 (2)	110 (4)	0.005-0.2	0	LC
155	Fenarimol	90 (12)	112 (2)	0.005-0.2	5	LC
156	Fenarimol	107 (11)	111 (1)	0.005-0.2	5	GC
157	Fenazaquin	116 (6)	118 (5)	0.005-0.2	-13	LC
158	Fenbendazole	114 (5)	119 (4)	0.005-0.2	-6	LC
159	Fenbuconazole	116 (4)	117 (3)	0.005-0.2	7	LC
160	Fenbuconazole	111 (7)	112 (1)	0.005-0.2	-1	GC
161	Fenchlorphos	109 (9)	112 (2)	0.005-0.2	16	GC
162	fenhexamid	119 (5)	111 (5)	0.005-0.2	5	LC
163	Fenhexamid	99 (15)	107 (2)	0.010-0.2	112	GC
164	Fenitrothion	ND	115 (1)	0.020-0.1	24	LC
165	Fenitrothion	117 (10)	112 (2)	0.005-0.2	48	GC
166	Fenobucarb	110 (5)	117 (2)	0.005-0.2	-8	LC
167	Fenoxycarb	113 (7)	116 (4)	0.005-0.2	5	LC
168	Fenpropathrin	ND	115 (4)	0.050-0.2	11	GC

169	Fenpropathrin	118 (2)	117 (4)	0.005-0.2	14	LC
170	Fenpropidin	84 (18)	85 (6)	0.005-0.2	-2	LC
171	Fenpropidin	74 (7)	73 (3)	0.005-0.2	-4	GC
172	Fenpropimorph	111 (5)	112 (1)	0.005-0.2	-3	LC
173	Fenpropimorph	101 (9)	108 (0)	0.005-0.2	38	GC
174	Fenpyrazamine	119 (6)	117 (3)	0.005-0.2	8	LC
175	Fenpyroximate	115 (4)	115 (5)	0.005-0.2	8	LC
176	Fenthion	114 (5)	111 (3)	0.005-0.2	3	LC
177	Fenthion	119 (10)	114 (5)	0.005-0.2	111	GC
178	Fenthion sulfone	119 (7)	120 (2)	0.005-0.2	7	LC
179	Fenthion sulfoxide	112 (11)	115 (2)	0.005-0.2	4	LC
180	Fenuron	113 (14)	120 (4)	0.005-0.2	-19	LC
181	Fenvalerate	109 (3)	108 (1)	0.005-0.2	4	GC
182	Fipronil	119 (20)	113 (6)	0.005-0.2	-10	LC
183	Fipronil	97 (4)	104 (7)	0.005-0.2	36	GC
184	Fipronil sulfone	113 (3)	112 (2)	0.005-0.2	8	LC
185	Flamprop-isopropyl	109 (6)	116 (2)	0.005-0.2	9	GC
186	Flamprop-methyl	111 (4)	115 (3)	0.005-0.2	9	GC
187	Flazasulfuron	118 (7)	120 (3)	0.005-0.2	27	LC
188	Flonicamid	112 (8)	114 (4)	0.005-0.2	-22	LC
189	Fluacrypyrim	113 (1)	114 (5)	0.005-0.2	-6	LC
190	Fluacrypyrim	99 (8)	119 (3)	0.010-0.2	13	GC
191	Fluazifop	87 (16)	107 (4)	0.010-0.2	2	LC
192	Fluazifop-p-butyl	104 (2)	115 (2)	0.005-0.2	14	GC
193	Flubendiamide	120 (4)	111 (6)	0.005-0.2	26	LC
194	Flucythrinate	112 (9)	108 (3)	0.005-0.2	11	GC
195	Fludioxonil	108 (12)	116 (5)	0.005-0.2	-3	LC
196	Fludioxonil	109 (14)	113 (3)	0.005-0.2	40	GC
197	Fluensulfone	ND	104 (18)	0.050-0.2	-11	LC
198	Flufenacet	ND	102 (17)	0.020-0.2	7	LC
199	Flufenoxuron	119 (8)	116 (6)	0.005-0.2	41	LC
200	Fluometuron	115 (8)	116 (2)	0.010-0.2	-12	LC
201	Fluopicolide	119 (4)	113 (3)	0.005-0.2	6	LC
202	Fluopicolide	111 (8)	118 (1)	0.005-0.2	9	GC
203	Fluopyram	120 (8)	112 (2)	0.005-0.2	-6	LC
204	Fluopyram	118 (10)	120 (1)	0.005-0.2	33	GC
205	Fluquinconazole	107 (6)	114 (3)	0.005-0.2	0	LC
206	Fluquinconazole	106 (8)	115 (0)	0.005-0.2	5	GC
207	Flusilazol	116 (6)	119 (1)	0.005-0.2	-1	LC
208	Flusilazole	115 (8)	115 (2)	0.005-0.2	24	GC
209	Flutolanil	110 (4)	116 (3)	0.005-0.2	27	GC
210	Flutriafol	119 (9)	120 (1)	0.005-0.2	-4	LC
211	Flutriafol	107 (10)	114 (1)	0.005-0.2	28	GC
212	Fluvalinate-tau	113 (16)	115 (4)	0.005-0.2	1	GC

213	Fluxapyroxad	112 (4)	121 (1)	0.005-0.2	-3	LC
214	Folpet + phthalimide	88 (12)	94 (10)	0.005-0.2	15	GC
215	Fonofos	111 (7)	115 (0)	0.005-0.2	13	GC
216	Formetanate	77 (18)	77 (5)	0.005-0.2	-2	LC
217	Formothion	116 (9)	121 (1)	0.005-0.2	-19	GC
218	Fosthiazate	112 (7)	113 (4)	0.005-0.2	-9	LC
219	Fosthiazate	ND	111 (5)	0.020-0.2	59	GC
220	Haloxyfop	113 (3)	114 (9)	0.005-0.2	7	LC
221	HCB	95 (5)	103 (2)	0.005-0.2	2	GC
222	Heptachlor	108 (9)	115 (1)	0.005-0.2	3	GC
223	Heptenophos	111 (9)	119 (1)	0.005-0.2	18	GC
224	Hexaconazole	114 (7)	116 (3)	0.005-0.2	-5	LC
225	Hexaconazole	ND	115 (3)	0.020-0.2	27	GC
226	Hexaflumuron	112 (8)	113 (3)	0.005-0.2	12	LC
227	Hexythiazox	112 (4)	118 (6)	0.005-0.2	50	LC
228	Imazalil	102 (4)	104 (4)	0.005-0.2	-9	LC
229	Imidacloprid	115 (11)	119 (4)	0.005-0.2	-10	LC
230	Indoxacarb	109 (3)	114 (6)	0.005-0.2	10	LC
231	Indoxacarb	104 (10)	109 (2)	0.010-0.2	-12	GC
232	Iprodione	ND	115 (12)	0.050-0.2	24	LC
233	Iprodione	ND	99 (5)	0.050-0.2	35	GC
234	Iprovalicarb	118 (9)	117 (2)	0.005-0.2	-1	LC
235	Iprovalicarb	ND	117 (4)	0.020-0.2	42	GC
236	Isazofos	109 (4)	117 (2)	0.005-0.2	10	GC
237	Isocarbophos	117 (13)	121 (16)	0.010-0.2	-10	LC
238	Isocarbophos	115 (12)	120 (2)	0.010-0.2	26	GC
239	Isofenphos	119 (6)	111 (1)	0.005-0.2	20	GC
240	Isofenphos methyl	106 (9)	118 (5)	0.005-0.2	11	LC
241	Isofenphos-methyl	119 (7)	113 (1)	0.005-0.2	21	GC
242	Isoprothiolane	120 (7)	116 (5)	0.005-0.2	-5	LC
243	Isoprothiolane	108 (6)	115 (3)	0.005-0.2	20	GC
244	Isoproturon	120 (8)	115 (5)	0.010-0.2	-11	LC
245	Isopyrazam	107 (7)	113 (1)	0.005-0.2	8	GC
246	Isoxaflutole	ND	ND	-	-	LC
247	Kresoxim methyl	115 (3)	113 (4)	0.005-0.2	1	LC
248	Kresoxim-methyl	109 (8)	115 (2)	0.005-0.2	14	GC
249	Lambda-Cyhalothrin	115 (8)	113 (4)	0.010-0.2	-37	GC
250	Lenacil	116 (6)	120 (2)	0.005-0.2	-12	LC
251	Lindane	113 (5)	111 (1)	0.005-0.2	4	GC
252	Linuron	109 (6)	113 (3)	0.005-0.2	-14	LC
253	Lufenuron	113 (9)	ND	0.005-0.2	171	LC
254	Malathion	112 (2)	113 (4)	0.005-0.2	-2	LC
255	Malathion	112 (11)	120 (2)	0.005-0.2	29	GC
256	Mandipropamid	103 (16)	111 (6)	0.005-0.2	9	LC

257	Mecarbam	94 (3)	119 (5)	0.010-0.2	29	GC
258	Mepanypirim	121 (2)	113 (8)	0.005-0.2	-1	LC
259	Merphos	94 (16)	110 (1)	0.010-0.2	491	GC
260	Metaflumizone	110 (7)	112 (7)	0.005-0.2	11	LC
261	Metalaxyl	78 (14)	116 (5)	0.005-0.2	-12	LC
262	Metalaxyl	83 (14)	113 (6)	0.010-0.2	19	GC
263	Metamitron	ND	ND	-	-	LC
264	Metazachlor	117 (4)	119 (4)	0.005-0.2	19	GC
265	Metconazole	115 (3)	116 (4)	0.005-0.2	5	LC
266	Metconazole	ND	103 (4)	0.020-0.2	2	GC
267	Methamidophos	108 (11)	109 (4)	0.005-0.2	-4	LC
268	Methidathion	117 (11)	116 (3)	0.005-0.2	-8	LC
269	Methidathion	113 (8)	118 (2)	0.005-0.2	33	GC
270	Methiocarb	120 (4)	114 (3)	0.005-0.2	-1	LC
271	Methiocarb	113 (12)	119 (4)	0.005-0.2	51	GC
272	Methiocarb sulfone	112 (8)	118 (2)	0.005-0.2	-19	LC
273	Methiocarb sulfoxide	116 (7)	113 (8)	0.005-0.2	-19	LC
274	Methomyl	96 (7)	113 (5)	0.005-0.2	-70	LC
275	Methoxychlor, o,p'-	113 (11)	110 (4)	0.005-0.2	27	GC
276	Methoxychlor, p,p'-	ND	118 (5)	0.020-0.2	-40	GC
277	methoxyfenozide	115 (3)	116 (3)	0.005-0.2	0	LC
278	Metobromuron	120 (7)	113 (2)	0.005-0.2	-9	LC
279	Metolachlor	113 (9)	117 (2)	0.005-0.2	-4	LC
280	Metolachlor	114 (7)	120 (2)	0.005-0.2	15	GC
281	Metolcarb	ND	112 (3)	0.020-0.2	-4	LC
282	Metrafenone	113 (2)	118 (7)	0.005-0.2	9	LC
283	Mevinphos	104 (10)	112 (4)	0.005-0.2	23	GC
284	Molinate	110 (12)	118 (2)	0.005-0.2	9	GC
285	Monocrotophos	117 (8)	112 (2)	0.005-0.2	-13	LC
286	Monolinuron	119 (6)	112 (4)	0.005-0.2	-9	LC
287	Monuron	116 (7)	118 (4)	0.005-0.2	-12	LC
288	Myclobutanil	112 (8)	113 (1)	0.005-0.2	13	GC
289	Myclobutanyl	102 (12)	119 (7)	0.005-0.2	2	LC
290	Napropamide	104 (11)	113 (2)	0.005-0.2	16	GC
291	Neburon	112 (2)	119 (4)	0.005-0.2	-3	LC
292	Nitempyram	94 (8)	97 (7)	0.005-0.2	-4	LC
293	Novaluron	120 (7)	114 (6)	0.005-0.2	9	LC
294	Novaluron	118 (15)	121 (5)	0.010-0.2	-26	GC
295	Nuarimol	114 (7)	116 (2)	0.005-0.2	11	GC
296	Omethoate	104 (9)	110 (6)	0.005-0.2	-8	LC
297	Oxadiargyl	109 (5)	114 (8)	0.005-0.2	22	LC
298	Oxadixyl	112 (19)	113 (2)	0.005-0.2	-9	LC
299	Oxadixyl	112 (8)	114 (2)	0.005-0.2	9	GC
300	Oxamyl	120 (9)	116 (2)	0.005-0.2	-2	LC

301	Oxasulfuron	115 (6)	112 (4)	0.005-0.2	19	LC
302	Oxfendazole	96 (7)	96 (6)	0.005-0.2	9	LC
303	Oxyfluorfen	117 (3)	108 (3)	0.005-0.2	3	LC
304	Paclobutrazol	115 (10)	114 (2)	0.005-0.2	-1	LC
305	Paclobutrazol	111 (8)	117 (2)	0.005-0.2	47	GC
306	Paraoxon methyl	109 (6)	120 (2)	0.005-0.2	-12	LC
307	Parathion	119 (9)	120 (1)	0.005-0.2	59	GC
308	Parathion-methyl	110 (12)	112 (2)	0.005-0.2	44	GC
309	Pebulate	106 (8)	114 (3)	0.005-0.2	19	GC
310	Penconazole	113 (2)	118 (1)	0.005-0.2	-1	LC
311	Penconazole	116 (7)	116 (0)	0.005-0.2	17	GC
312	Pencyuron	120 (3)	115 (2)	0.005-0.2	3	LC
313	Pendimethalin	120 (10)	118 (5)	0.005-0.2	20	LC
314	Pendimethalin	111 (8)	120 (1)	0.005-0.2	50	GC
315	Penflufen	118 (5)	113 (3)	0.005-0.2	0	LC
316	Penthiopyrad	118 (6)	111 (1)	0.005-0.2	-4	LC
317	Penthiopyrad	115 (8)	119 (2)	0.005-0.2	33	GC
318	Permethrin	108 (12)	110 (2)	0.005-0.2	6	GC
319	Permethrin	119 (4)	114 (4)	0.005-0.2	3	LC
320	Phenthoate	118 (9)	115 (3)	0.005-0.2	-5	LC
321	Phenthoate	117 (8)	119 (4)	0.005-0.2	6	GC
322	Phorate	121 (7)	111 (7)	0.005-0.2	178	GC
323	Phosalone	118 (6)	113 (5)	0.005-0.2	14	LC
324	Phosmet	118 (2)	112 (3)	0.005-0.2	-1	LC
325	Phosmet	119 (11)	111 (7)	0.005-0.2	26	GC
326	Phoxim	118 (9)	121 (6)	0.005-0.2	-7	LC
327	Picolinafen	109 (10)	110 (2)	0.005-0.2	30	GC
328	Picoxystrobin	114 (10)	117 (3)	0.005-0.2	21	GC
329	Pirimicarb	114 (6)	114 (2)	0.005-0.2	-11	LC
330	Pirimicarb	113 (8)	117 (1)	0.005-0.2	19	GC
331	Pirimicarb desmethyl	109 (7)	111 (5)	0.005-0.2	-23	LC
332	Pirimiphos-methyl	113 (1)	115 (4)	0.005-0.2	1	LC
333	Pirimiphos-methyl	113 (8)	116 (2)	0.005-0.2	12	GC
334	Prochloraz	114 (5)	115 (6)	0.005-0.2	-2	LC
335	Procymidone	109 (9)	117 (1)	0.005-0.2	11	GC
336	Profenofos	114 (3)	116 (3)	0.005-0.2	-1	LC
337	Profenofos	115 (5)	113 (5)	0.005-0.2	39	GC
338	Promecarb	111 (4)	115 (4)	0.005-0.2	-8	LC
339	Prometon	111 (7)	118 (1)	0.005-0.2	18	GC
340	Prometryn	114 (7)	112 (3)	0.005-0.2	-8	LC
341	Prometryn	107 (9)	116 (1)	0.005-0.2	16	GC
342	Propamocarb	43 (18)	34 (10)	0.005-0.2	4	LC
343	Propaphos	118 (12)	113 (3)	0.005-0.2	201	GC
344	Propaquizafop	116 (2)	119 (6)	0.005-0.2	3	LC

345	Propargite	117 (7)	112 (6)	0.005-0.2	9	LC
346	Propazine	119 (5)	114 (1)	0.005-0.2	-11	LC
347	Propazine	113 (7)	116 (1)	0.005-0.2	13	GC
348	Propiconazole	104 (8)	115 (2)	0.005-0.2	1	GC
349	Propiconazole	92 (13)	116 (6)	0.005-0.2	0	LC
350	Propoxur	115 (5)	111 (6)	0.005-0.2	-9	LC
351	Propyzamide	121 (11)	107 (8)	0.010-0.2	-13	LC
352	Propyzamide	113 (5)	119 (5)	0.005-0.2	21	GC
353	Proquinazid	113 (6)	113 (6)	0.005-0.2	13	LC
354	Prosulfocarb	119 (6)	114 (4)	0.005-0.2	0	LC
355	Prosulfocarb	106 (11)	117 (3)	0.005-0.2	17	GC
356	Prothioconazole	ND	120 (9)	0.05-0.2	14	LC
357	Prothiofos	105 (10)	114 (2)	0.005-0.2	1	LC
358	Prothiofos	102 (10)	113 (3)	0.005-0.2	10	GC
359	Pymetrozine	85 (9)	81 (8)	0.005-0.2	-9	LC
360	Pyraclostrobin	119 (8)	114 (4)	0.005-0.2	0	LC
361	Pyraclostrobin	108 (10)	109 (3)	0.005-0.2	43	GC
362	Pyrazophos	107 (13)	114 (2)	0.005-0.2	13	GC
363	Pyrethrin	121 (9)	121 (2)	0.005-0.2	5	LC
364	Pyridaben	115 (6)	113 (7)	0.005-0.2	4	LC
365	Pyridaben	ND	103 (6)	0.020-0.2	21	GC
366	Pyridalyl	ND	ND	-	-	LC
367	Pyridaphenthion	119 (6)	113 (4)	0.005-0.2	7	LC
368	Pyridate	108 (4)	118 (6)	0.005-0.2	3	LC
369	Pyrifenox	113 (2)	115 (2)	0.005-0.2	38	GC
370	Pyrimethanil	111 (9)	120 (2)	0.005-0.2	-6	LC
371	Pyrimethanil	111 (9)	114 (5)	0.005-0.2	18	GC
372	Pyriofenone	113 (1)	113 (5)	0.005-0.2	-8	LC
373	Pyriofenone	107 (14)	117 (1)	0.005-0.2	-3	GC
374	Pyriproxyfen	117 (5)	117 (5)	0.005-0.2	-9	LC
375	Pyriproxyfen	109 (4)	106 (5)	0.010-0.2	-13	GC
376	Quinalphos	100 (18)	115 (3)	0.005-0.2	8	LC
377	Quinalphos	ND	110 (3)	0.020-0.2	38	GC
378	Quinoclamine	111 (4)	116 (3)	0.005-0.2	-25	LC
379	Quinoxyfen	120 (5)	113 (4)	0.005-0.2	-3	LC
380	Quinoxyfen	107 (8)	112 (2)	0.005-0.2	-6	GC
381	Quintozene	111 (7)	105 (1)	0.005-0.2	19	GC
382	Quizalofop	ND	84 (10)	0.020-0.2	29	LC
383	Quizalofop-ethyl	120 (4)	117 (4)	0.005-0.2	1	LC
384	Rotenone	115 (14)	119 (6)	0.005-0.2	9	LC
385	Secbumeton	ND	115 (3)	0.050-0.2	38	GC
386	Simazine	120 (12)	119 (5)	0.010-0.2	-22	LC
387	Spinetoram	84 (15)	96 (7)	0.005-0.2	9	LC
388	Spirodiclofen	112 (7)	116 (6)	0.005-0.2	0	LC

389	Spirodiclofen	99 (7)	105 (4)	0.005-0.2	-7	GC
390	Spiromesifen	102 (10)	114 (7)	0.005-0.2	-12	LC
391	Spiromesifen	115 (7)	110 (3)	0.005-0.2	-12	GC
392	Spirosad	82 (12)	93 (4)	0.005-0.2	7	LC
393	Spirotetramat	114 (4)	119 (3)	0.005-0.2	20	LC
394	Spiroxamine	90 (10)	97 (3)	0.005-0.2	1	LC
395	Sulfotep	111 (10)	110 (2)	0.005-0.2	6	GC
396	Sulfoxaflor	150 (7)	106 (12)	0.005-0.2	-16	LC
397	Sulprofos	115 (16)	113 (2)	0.005-0.2	92	GC
398	Tebuconazole	120 (10)	118 (4)	0.005-0.2	12	LC
399	Tebuconazole	113 (6)	116 (2)	0.005-0.2	26	GC
400	Tebufenozide	120 (5)	119 (6)	0.005-0.2	1	LC
401	Tebufenpyrad	113 (6)	117 (5)	0.005-0.2	5	LC
402	Tebufenpyrad	114 (6)	116 (2)	0.005-0.2	11	GC
403	Tecnazene	110 (12)	116 (2)	0.005-0.2	14	GC
404	Teflubenzuron	113 (16)	119 (3)	0.005-0.2	46	LC
405	Tefluthrin	115 (7)	118 (2)	0.005-0.2	11	GC
406	Terbufos	114 (12)	117 (5)	0.005-0.2	206	GC
407	Terbumeton	107 (13)	114 (3)	0.005-0.2	17	GC
408	Terbuthylazine	118 (4)	113 (3)	0.005-0.2	-15	LC
409	Terbutryn	119 (6)	112 (2)	0.005-0.2	-3	LC
410	Terbutryn	117 (5)	119 (2)	0.005-0.2	20	GC
411	Tetrachlorvinphos	111 (7)	117 (3)	0.005-0.2	39	GC
412	Tetraconazole	114 (7)	111 (1)	0.005-0.2	-4	LC
413	Tetraconazole	112 (7)	117 (1)	0.005-0.2	24	GC
414	Tetradifon	106 (9)	114 (3)	0.005-0.2	-27	GC
415	Tetramethrin	116 (8)	108 (1)	0.010-0.2	30	GC
416	Thiabendazole	74 (10)	73 (3)	0.005-0.2	-10	LC
417	Thiacloprid	119 (7)	117 (3)	0.005-0.2	-15	LC
418	Thiamethoxam	118 (8)	115 (4)	0.005-0.2	-50	LC
419	Thiobencarb	112 (13)	118 (7)	0.005-0.2	3	LC
420	Thiobencarb	112 (13)	111 (2)	0.005-0.2	15	GC
421	Tolclofos methyl	117 (10)	117 (2)	0.005-0.2	-2	LC
422	Tolclofos-methyl	110 (8)	119 (1)	0.005-0.2	6	GC
423	Tolfenpyrad	96 (16)	116 (6)	0.010-0.2	20	LC
424	Tolylfluanid	98 (16)	120 (1)	0.005-0.2	12	GC
425	Triadimefon	109 (7)	112 (2)	0.005-0.2	19	GC
426	Triadimenol	120 (1)	117 (5)	0.010-0.2	6	LC
427	Triallate	115 (8)	116 (3)	0.005-0.2	5	LC
428	Triallate	112 (7)	117 (1)	0.005-0.2	8	GC
429	Triazophos	111 (6)	118 (6)	0.005-0.2	0	LC
430	Triazophos	116 (8)	115 (3)	0.005-0.2	18	GC
431	Triclocarban	115 (12)	110 (3)	0.005-0.2	23	LC
432	Tricyclazole	111 (8)	110 (5)	0.005-0.2	-15	LC

433	Trifloxystrobin	118 (5)	119 (6)	0.005-0.2	-1	LC
434	Trifloxystrobin	120 (13)	115 (4)	0.005-0.2	13	GC
435	Triflumizole	120 (8)	120 (4)	0.005-0.2	0	LC
436	Triflumuron	119 (11)	112 (8)	0.005-0.2	28	LC
437	Trifluralin	113 (6)	120 (1)	0.005-0.2	29	GC
438	Triticonazole	112 (3)	111 (5)	0.005-0.2	7	LC
439	Tritosulfuron	112 (11)	113 (7)	0.005-0.2	22	LC
440	Vinclozolin	87 (9)	94 (16)	0.005-0.2	-77	LC
441	Vinclozolin	118 (5)	113 (9)	0.005-0.2	8	GC
442	XMC	112 (13)	114 (2)	0.005-0.2	-11	LC
443	Zoxamide	112 (5)	119 (5)	0.005-0.2	0	LC

***See carbofuran**

ND: Not detected (below the instrumental LOQ)
GC: Gas chromatography coupled to tandem mass spectrometry
LC: Liquid chromatography coupled to tandem mass spectrometry

Table 4. Accuracy data (as % recovery) and precision data (as repeatability RSD_r, n=5) at 0.010 and 0.050 mg/kg, linearity range and matrix effects for cocoa samples and automatic extraction method.

No.	Name	Recov. 0.010 mg/kg (RSD) (%)	Recov. 0.050 mg/kg (RSD) (%)	Linear range (mg/kg)	Matrix effect (%)	Analytical technique
1	2,4'-DDE	93 (4)	94 (6)	0.005-0.2	2	GC
2	2.4 D	85 (7)	74 (12)	0.005-0.2	-6	LC
3	4,4'-DDD	100 (3)	95 (5)	0.005-0.2	8	GC
4	4,4'-DDE	98 (6)	90 (7)	0.005-0.2	5	GC
5	4,4'-DDT	113 (5)	97 (9)	0.010-0.2	9	GC
6	Abamectin	120 (17)	89 (19)	0.005-0.2	16	LC
7	Acephate	92 (16)	78 (14)	0.005-0.2	-48	LC
8	Acetamiprid	99 (4)	95 (7)	0.005-0.2	-1	LC
9	Acrinathrin	106 (8)	93 (3)	0.005-0.2	48	GC
10	Alachlor	112 (7)	105 (4)	0.005-0.2	12	GC
11	Alachlor	100 (12)	106 (5)	0.005-0.2	1	LC
12	Albendazole	113 (5)	104 (3)	0.005-0.2	1	LC
13	Aldicarb	98 (4)	106 (7)	0.005-0.2	3	LC
14	Aldicarb sulfone	90 (9)	93 (7)	0.005-0.2	2	LC
15	Aldicarb_sulfoxide	88 (13)	74 (11)	0.005-0.2	-1	LC
16	Ametoctradin	109 (9)	100 (5)	0.005-0.2	5	LC
17	Ametryn	114 (9)	102 (7)	0.005-0.2	3	GC
18	Anilofos	118 (3)	103 (6)	0.005-0.2	6	LC
19	Anthraquinone	108 (8)	88 (5)	0.005-0.2	34	GC
20	Atrazine	105 (4)	102 (2)	0.005-0.2	8	GC
21	Atrazine	115 (1)	109 (3)	0.005-0.2	-2	LC
22	Azinphos_methyl	111 (3)	109 (4)	0.005-0.2	1	LC
23	Azinphos-ethyl	112 (14)	102 (3)	0.005-0.2	6	LC
24	Azoxystrobin	98 (4)	96 (3)	0.010-0.2	15	GC
25	Azoxystrobin	113 (1)	108 (4)	0.005-0.2	2	LC
26	BAC10	89 (5)	82 (10)	0.005-0.2	4	LC
27	BAC8	81 (7)	76 (12)	0.005-0.2	-1	LC
28	Benalaxyl	107 (7)	100 (3)	0.005-0.2	7	GC
29	Benalaxyl	114 (2)	109 (2)	0.005-0.2	2	LC
30	Bendiocarb	111 (4)	109 (3)	0.005-0.2	5	LC
31	Benfuracarb*					LC
32	Bifenazate	90 (10)	87 (5)	0.005-0.2	-38	LC
33	Bifenox	101 (15)	103 (3)	0.010-0.2	-12	GC
34	Bifenthrin	115 (6)	100 (5)	0.005-0.2	19	GC
35	Bifenthrin	119 (1)	106 (3)	0.005-0.2	4	LC
36	Biphenyl	86 (10)	74 (10)	0.005-0.2	1	GC
37	Bitertanol	119 (17)	97 (3)	0.005-0.2	-2	LC
38	Bixafen	119 (5)	110 (3)	0.005-0.2	8	GC
39	Boscalid	115 (19)	104 (4)	0.005-0.2	7	GC

40	Boscalid	105 (14)	106 (4)	0.005-0.2	5	LC
41	Bromacil	107 (8)	99 (4)	0.005-0.2	11	LC
42	Bromopropylate	104 (6)	97 (4)	0.005-0.2	22	GC
43	Bromuconazole	100 (2)	104 (1)	0.005-0.2	6	LC
44	Bupirimate	105 (5)	95 (7)	0.005-0.2	20	GC
45	Bupirimate	117 (2)	105 (3)	0.005-0.2	4	LC
46	Buprofezin	103 (8)	93 (8)	0.005-0.2	18	GC
47	Buprofezin	114 (3)	106 (3)	0.005-0.2	-4	LC
48	Butoxycarboxim	83 (6)	84 (9)	0.005-0.2	-2	LC
49	Butralin	107 (3)	87 (5)	0.005-0.2	23	GC
50	Butylate	102 (6)	92 (8)	0.005-0.2	5	GC
51	Cadusafos	111 (3)	99 (6)	0.005-0.2	9	GC
52	Captan + tetrahydrophthalimide	94 (14)	101 (10)	0.005-0.2	14	GC
53	Carbaryl	101 (9)	109 (5)	0.005-0.2	6	LC
54	Carbendazim	103 (6)	96 (5)	0.005-0.2	-2	LC
55	Carbofuran	74 (2)	120 (6)	0.005-0.2	-27	LC
56	Carbofuran + carbosulfan	112 (2)	91 (5)	0.010-0.2	32	GC
57	Carbophenothion	103 (11)	95 (8)	0.005-0.2	-6	GC
58	Chinomethionate	100 (8)	88 (7)	0.005-0.2	10	GC
59	chlorantraniliprole	115 (3)	104 (5)	0.005-0.2	5	LC
60	Chlorbromuron	112 (8)	85 (5)	0.005-0.2	7	GC
61	Chlorbromuron	115 (6)	112 (1)	0.005-0.2	2	LC
62	Chlordane	ND	96 (7)	0.020-0.2	3	GC
63	Chlorfenapyr	99 (9)	97 (0)	0.010-0.2	9	GC
64	Chlorfenvinphos	117 (8)	104 (2)	0.010-0.2	28	GC
65	Chlorfenvinphos	112 (4)	108 (3)	0.005-0.2	2	LC
66	Chlorfluazuron	120 (5)	108 (2)	0.005-0.2	7	LC
67	Chloridazon	96 (5)	91 (10)	0.005-0.2	-6	LC
68	Chlorobenzilate	107 (2)	95 (5)	0.005-0.2	57	GC
69	Chlorothalonil	111 (2)	91 (9)	0.005-0.2	-8	GC
70	Chlorotoluron	115 (4)	104 (2)	0.005-0.2	0	LC
71	Chloroxuron	119 (5)	114 (6)	0.005-0.2	1	LC
72	Chlorpropham	109 (8)	98 (6)	0.005-0.2	13	GC
73	Chlorpyrifos	102 (2)	99 (7)	0.005-0.2	10	GC
74	Chlorpyrifos methyl	120 (15)	114 (9)	0.005-0.2	4	LC
75	Chlorpyrifos-methyl	111 (9)	104 (4)	0.005-0.2	4	GC
76	Chlorpyriphos	120 (5)	107 (5)	0.005-0.2	-9	LC
77	Chlorthal-dimethyl	112 (6)	101 (9)	0.005-0.2	9	GC
78	Chlozolinate	100 (7)	98 (5)	0.005-0.2	13	GC
79	Chromafenozide	116 (2)	107 (3)	0.005-0.2	2	LC
80	Clofentezine	113 (4)	108 (3)	0.005-0.2	10	LC
81	Clomazone	111 (4)	109 (1)	0.005-0.2	6	LC
82	Coumaphos	100 (5)	96 (3)	0.005-0.2	-2	GC
83	Coumaphos	118 (4)	108 (3)	0.005-0.2	0	LC

84	Cyazofamid	115 (11)	116 (4)	0.005-0.2	6	LC
85	Cyflufenamid	114 (13)	112 (5)	0.005-0.2	-1	LC
86	Cyfluthrin	106 (6)	97 (7)	0.005-0.2	8	GC
87	Cyhalofop-buthyl	120 (9)	116 (5)	0.005-0.2	9	LC
88	Cymoxanil	104 (3)	99 (5)	0.005-0.2	6	LC
89	Cypermethrin	106 (7)	105 (3)	0.010-0.2	-6	GC
90	Cyproconazole	107 (4)	97 (4)	0.005-0.2	60	GC
91	Cyproconazole	119 (8)	104 (4)	0.005-0.2	7	LC
92	Cyprodinil	105 (4)	94 (7)	0.005-0.2	13	GC
93	Cyprodinil	109 (4)	102 (4)	0.005-0.2	-3	LC
94	Cyromazine	40 (20)	34 (16)	0.005-0.2	-5	LC
95	Dazomet	38 (13)	28 (17)	0.005-0.2	-34	LC
96	DEET	109 (4)	105 (5)	0.005-0.2	4	LC
97	Deltamethrin	114 (7)	88 (10)	0.005-0.2	24	GC
98	Demeton-S-methylsulfone	91 (10)	85 (7)	0.005-0.2	2	LC
99	Demeton-S-methylsulfoxide	70 (7)	65 (10)	0.005-0.2	0	LC
100	Desethylterbuthylazine	110 (1)	108 (1)	0.005-0.2	-5	LC
101	Diazinon	109 (3)	102 (5)	0.005-0.2	7	GC
102	Diazinon	117 (12)	106 (1)	0.005-0.2	3	LC
103	Dichlofluanid	114 (9)	81 (12)	0.005-0.2	21	GC
104	Dichloran	102 (8)	88 (7)	0.005-0.2	9	GC
105	Dichlorvos	104 (7)	90 (7)	0.005-0.2	5	GC
106	Dichlorvos	93 (14)	96 (6)	0.005-0.2	1	LC
107	Diclobutrazol	107 (4)	93 (4)	0.005-0.2	29	GC
108	Dicofol, o, p'-	87 (4)	93 (5)	0.005-0.2	-5	GC
109	Dicofol, p, p'-	105 (3)	96 (5)	0.005-0.2	61	GC
110	Dicrotophos	84 (7)	80 (10)	0.005-0.2	-2	LC
111	Dieldrin	105 (8)	102 (6)	0.005-0.2	1	GC
112	Diethofencarb	115 (4)	113 (2)	0.005-0.2	1	LC
113	Difenoconazole	111 (5)	111 (2)	0.005-0.2	10	LC
114	Difenoxuron	107 (3)	105 (1)	0.005-0.2	4	LC
115	Dimethenamid	112 (3)	99 (4)	0.005-0.2	11	GC
116	Dimethipin	89 (11)	84 (5)	0.005-0.2	4	GC
117	Dimethoate	103 (7)	96 (7)	0.005-0.2	-70	LC
118	Dimethomorph	115 (5)	102 (5)	0.005-0.2	-1	LC
119	Dimethylvinphos	112 (5)	110 (2)	0.005-0.2	4	LC
120	Diniconazole	105 (2)	101 (3)	0.005-0.2	11	LC
121	Diphenylamine	97 (11)	87 (3)	0.005-0.2	1	GC
122	Disulfoton	ND	ND	-	-	GC
123	Dithianon	ND	105 (17)	0.005-0.2	56	LC
124	DMF	107 (8)	102 (7)	0.005-0.2	1	LC
125	DMPF	65 (10)	68 (9)	0.005-0.2	-3	LC
126	Dodemorph	92 (1)	71 (6)	0.010-0.2	-21	GC
127	Edifenphos	114 (4)	110 (4)	0.005-0.2	4	LC

128	emamectin	56 (5)	55 (4)	0.005-0.2	1	LC
129	Endosulfan sulfate	112 (5)	103 (7)	0.005-0.2	-9	GC
130	Endosulfan-alpha	102 (6)	98 (9)	0.005-0.2	9	GC
131	Endosulfan-beta	108 (7)	101 (4)	0.010-0.2	7	GC
132	Endrin	ND	106 (10)	0.050-0.2	14	GC
133	EPN	113 (2)	104 (7)	0.005-0.2	-8	GC
134	EPN	120 (10)	103 (9)	0.005-0.2	3	LC
135	Epoxiconazole	105 (6)	93 (4)	0.005-0.2	8	GC
136	Epoxiconazole	109 (7)	106 (5)	0.005-0.2	6	LC
137	Ethiofencarb	100 (15)	110 (1)	0.005-0.2	-3	LC
138	Ethion	104 (3)	96 (4)	0.005-0.2	23	GC
139	Ethion	119 (3)	109 (4)	0.005-0.2	-1	LC
140	Ethiprole	110 (6)	108 (3)	0.005-0.2	2	LC
141	Ethirimol	73 (2)	76 (9)	0.005-0.2	2	LC
142	Ethofumesate	111 (4)	100 (5)	0.005-0.2	16	GC
143	Ethoprophos	110 (2)	98 (5)	0.005-0.2	15	GC
144	Ethoprophos	106 (5)	114 (2)	0.005-0.2	2	LC
145	Etofenprox	117 (7)	99 (6)	0.005-0.2	3	GC
146	Etofenprox	120 (3)	104 (5)	0.005-0.2	4	LC
147	Etoxazole	120 (1)	106 (5)	0.005-0.2	-9	LC
148	Etrimfos	109 (1)	100 (3)	0.005-0.2	5	GC
149	Famoxadone	115 (16)	89 (20)	0.01-0.2	16	LC
150	Fenamidone	109 (15)	102 (6)	0.005-0.2	10	GC
151	Fenamidone	114 (5)	108 (3)	0.005-0.2	2	LC
152	Fenamiphos	115 (2)	107 (4)	0.005-0.2	4	LC
153	Fenamiphos - sulfone	108 (5)	105 (3)	0.005-0.2	5	LC
154	Fenamiphos - sulfoxide	93 (7)	87 (8)	0.005-0.2	2	LC
155	Fenarimol	108 (5)	99 (4)	0.005-0.2	12	GC
156	Fenarimol	118 (8)	109 (6)	0.005-0.2	5	LC
157	Fenazaquin	112 (5)	98 (4)	0.005-0.2	-6	LC
158	Fenbendazole	111 (5)	101 (5)	0.005-0.2	4	LC
159	Fenbuconazole	116 (4)	102 (4)	0.005-0.2	12	GC
160	Fenbuconazole	105 (2)	106 (1)	0.005-0.2	10	LC
161	Fenchlorphos	108 (7)	97 (4)	0.005-0.2	13	GC
162	Fenhexamid	95 (3)	98 (6)	0.010-0.2	24	GC
163	fenhexamid	106 (7)	99 (6)	0.005-0.2	6	LC
164	Fenitrothion	110 (2)	92 (8)	0.005-0.2	26	GC
165	Fenitrothion	ND	ND	-	-	LC
166	Fenobucarb	120 (3)	113 (4)	0.005-0.2	0	LC
167	Fenoxycarb	113 (6)	106 (5)	0.005-0.2	2	LC
168	Fenpropathrin	ND	103 (4)	0.020-0.2	-1	GC
169	Fenpropathrin	119 (4)	105 (1)	0.005-0.2	6	LC
170	Fenpropidin	ND	81 (11)	0.020-0.2	-23	GC
171	Fenpropidin	78 (8)	72 (12)	0.005-0.2	-2	LC

172	Fenpropimorph	99 (4)	93 (13)	0.005-0.2	-12	GC
173	Fenpropimorph	99 (3)	94 (5)	0.005-0.2	-1	LC
174	Fenpyrazamine	110 (2)	109 (4)	0.005-0.2	7	LC
175	Fenpyroximate	118 (2)	105 (5)	0.005-0.2	1	LC
176	Fenthion	ND	115 (4)	0.050-0.2	-73	GC
177	Fenthion	110 (6)	106 (6)	0.005-0.2	2	LC
178	Fenthion sulfone	106 (1)	104 (3)	0.005-0.2	7	LC
179	Fenthion sulfoxide	106 (4)	98 (3)	0.005-0.2	4	LC
180	Fenuron	105 (7)	96 (8)	0.005-0.2	1	LC
181	Fenvalerate	109 (8)	115 (5)	0.005-0.2	-3	GC
182	Fipronil	89 (2)	92 (5)	0.005-0.2	37	GC
183	Fipronil	115 (11)	120 (5)	0.005-0.2	3	LC
184	Fipronil sulfone	114 (4)	107 (2)	0.005-0.2	1	LC
185	Flamprop-isopropyl	107 (2)	101 (5)	0.005-0.2	19	GC
186	Flamprop-methyl	110 (9)	98 (5)	0.005-0.2	17	GC
187	Flazasulfuron	98 (4)	94 (8)	0.005-0.2	0	LC
188	Flonicamid	92 (8)	93 (7)	0.005-0.2	6	LC
189	Fluacrypyrim	114 (1)	99 (7)	0.005-0.2	16	GC
190	Fluacrypyrim	110 (2)	114 (2)	0.005-0.2	-2	LC
191	Fluazifop	108 (6)	112 (10)	0.005-0.2	2	LC
192	Fluazifop-p-butyl	106 (4)	98 (7)	0.005-0.2	19	GC
193	Flubendiamide	120 (10)	102 (4)	0.005-0.2	4	LC
194	Flucythrinate	111 (6)	110 (5)	0.005-0.2	11	GC
195	Fludioxonil	98 (6)	98 (11)	0.010-0.2	7	GC
196	Fludioxonil	119 (1)	100 (8)	0.005-0.2	4	LC
197	Fluensulfone	92 (18)	101 (6)	0.005-0.1	30	LC
198	Flufenacet	104 (3)	119 (7)	0.005-0.2	-3	LC
199	Flufenoxuron	119 (2)	109 (4)	0.005-0.2	3	LC
200	Fluometuron	108 (4)	108 (5)	0.005-0.2	3	LC
201	Fluopicolide	114 (10)	100 (7)	0.005-0.2	7	GC
202	Fluopicolide	112 (4)	106 (1)	0.005-0.2	3	LC
203	Fluopyram	108 (2)	100 (6)	0.005-0.2	24	GC
204	Fluopyram	118 (2)	115 (1)	0.005-0.2	0	LC
205	Fluquinconazole	109 (2)	100 (5)	0.005-0.2	10	GC
206	Fluquinconazole	116 (16)	103 (7)	0.005-0.2	6	LC
207	Flusilazol	112 (7)	106 (4)	0.005-0.2	3	LC
208	Flusilazole	111 (5)	96 (7)	0.005-0.2	17	GC
209	Flutolanil	107 (12)	95 (6)	0.005-0.2	20	GC
210	Flutriafol	103 (6)	89 (7)	0.005-0.2	19	GC
211	Flutriafol	96 (6)	102 (3)	0.005-0.2	2	LC
212	Fluvalinate-tau	112 (2)	98 (8)	0.005-0.2	19	GC
213	Fluxapyroxad	118 (2)	109 (2)	0.005-0.2	3	LC
214	Folpet + phthalimide	114 (6)	110 (9)	0.005-0.2	-7	GC
215	Fonofos	111 (9)	99 (7)	0.005-0.2	-3	GC

216	Formetanate	71 (9)	79 (7)	0.005-0.2	-15	LC
217	Formothion	104 (5)	86 (8)	0.005-0.2	12	GC
218	Fosthiazate	103 (7)	88 (7)	0.010-0.2	14	GC
219	Fosthiazate	108 (2)	102 (4)	0.005-0.2	-1	LC
220	Haloxyfop	120 (8)	115 (6)	0.005-0.2	5	LC
221	HCB	81 (9)	72 (7)	0.005-0.2	8	GC
222	Heptachlor	104 (7)	93 (5)	0.005-0.2	6	GC
223	Heptenophos	110 (4)	97 (5)	0.005-0.2	15	GC
224	Hexaconazole	104 (5)	97 (8)	0.005-0.2	10	GC
225	Hexaconazole	119 (9)	109 (5)	0.005-0.2	-1	LC
226	Hexaflumuron	118 (9)	104 (2)	0.005-0.2	0	LC
227	Hexythiazox	120 (0)	105 (7)	0.005-0.2	4	LC
228	Imazalil	100 (2)	90 (4)	0.005-0.2	0	LC
229	Imidacloprid	100 (8)	92 (10)	0.005-0.2	-3	LC
230	Indoxacarb	111 (2)	105 (6)	0.010-0.2	-18	GC
231	Indoxacarb	120 (7)	108 (6)	0.005-0.2	7	LC
232	Iprodione	ND	120 (16)	0.050-0.2	15	GC
233	Iprodione	120 (15)	114 (14)	0.01-0.2	31	LC
234	Iprovalicarb	91 (10)	94 (4)	0.010-0.2	31	GC
235	Iprovalicarb	112 (3)	108 (2)	0.005-0.2	1	LC
236	Isazofos	117 (6)	104 (5)	0.005-0.2	8	GC
237	Isocarbophos	ND	117 (8)	0.050-0.2	10	GC
238	Isocarbophos	115 (11)	120 (6)	0.005-0.05	-15	LC
239	Isofenphos	118 (5)	102 (8)	0.005-0.2	-5	GC
240	Isofenphos methyl	110 (6)	119 (9)	0.005-0.2	15	LC
241	Isofenphos-methyl	113 (5)	101 (6)	0.005-0.2	-1	GC
242	Isoprothiolane	109 (3)	97 (5)	0.005-0.2	14	GC
243	Isoprothiolane	118 (2)	106 (6)	0.005-0.2	2	LC
244	Isoproturon	120 (1)	104 (4)	0.005-0.2	1	LC
245	Isopyrazam	107 (5)	102 (6)	0.005-0.2	21	GC
246	Isoxaflutole	ND	ND	-	-	LC
247	Kresoxim methyl	120 (3)	111 (7)	0.005-0.2	3	LC
248	Kresoxim-methyl	109 (1)	103 (5)	0.005-0.2	15	GC
249	Lambda-Cyhalothrin	105 (3)	98 (4)	0.005-0.2	25	GC
250	Lenacil	113 (5)	104 (6)	0.005-0.2	6	LC
251	Lindane	112 (1)	99 (4)	0.005-0.2	8	GC
252	Linuron	120 (5)	108 (2)	0.005-0.2	3	LC
253	Lufenuron	119 (5)	112 (7)	0.005-0.2	9	LC
254	Malathion	108 (6)	98 (7)	0.005-0.2	27	GC
255	Malathion	110 (5)	111 (5)	0.005-0.2	3	LC
256	Mandipropamid	117 (6)	102 (3)	0.005-0.2	6	LC
257	Mecarbam	ND	96 (6)	0.020-0.2	23	GC
258	Mepanypirim	109 (8)	110 (4)	0.005-0.2	-1	LC
259	Merphos	104 (3)	96 (7)	0.010-0.2	460	GC

260	Metaflumizone	116 (10)	109 (4)	0.005-0.2	2	LC
261	Metalaxyl	112 (18)	97 (5)	0.005-0.2	18	GC
262	Metalaxyl	92 (16)	110 (3)	0.005-0.2	3	LC
263	Metamitron	113 (5)	97 (4)	0.005-0.2	-1	LC
264	Metazachlor	107 (6)	94 (4)	0.005-0.2	15	GC
265	Metconazole	109 (6)	99 (5)	0.010-0.2	17	GC
266	Metconazole	120 (8)	102 (4)	0.005-0.2	6	LC
267	Methamidophos	81 (11)	77 (9)	0.005-0.2	2	LC
268	Methidathion	100 (3)	90 (5)	0.005-0.2	10	GC
269	Methidathion	105 (5)	111 (3)	0.005-0.2	3	LC
270	Methiocarb	96 (17)	90 (12)	0.005-0.2	-20	GC
271	Methiocarb	110 (3)	115 (4)	0.005-0.2	5	LC
272	Methiocarb sulfone	107 (7)	98 (9)	0.005-0.2	11	LC
273	Methiocarb sulfoxide	93 (8)	91 (6)	0.005-0.2	1	LC
274	Methomyl	98 (9)	89 (9)	0.005-0.2	-6	LC
275	Methoxychlor, o,p'-	102 (7)	103 (4)	0.005-0.2	11	GC
276	Methoxychlor, p,p'-	ND	108 (3)	0.050-0.2	7	GC
277	methoxyfenozide	111 (3)	118 (2)	0.005-0.2	4	LC
278	Metobromuron	105 (3)	110 (3)	0.005-0.2	0	LC
279	Metolachlor	109 (5)	100 (5)	0.005-0.2	15	GC
280	Metolachlor	110 (4)	107 (6)	0.005-0.2	2	LC
281	Metolcarb	114 (4)	103 (6)	0.005-0.2	7	LC
282	Metrafenone	120 (1)	111 (3)	0.005-0.2	9	LC
283	Mevinphos	96 (9)	78 (4)	0.005-0.2	25	GC
284	Molinate	101 (10)	93 (4)	0.005-0.2	14	GC
285	Monocrotophos	86 (10)	85 (10)	0.005-0.2	6	LC
286	Monolinuron	108 (3)	105 (4)	0.005-0.2	2	LC
287	Monuron	106 (4)	98 (4)	0.005-0.2	-1	LC
288	Myclobutanil	104 (5)	95 (6)	0.005-0.2	11	GC
289	Myclobutanyl	111 (4)	110 (4)	0.005-0.2	10	LC
290	Napropamide	103 (8)	97 (5)	0.005-0.2	14	GC
291	Neburon	120 (5)	117 (3)	0.005-0.2	-2	LC
292	Nitempyram	86 (12)	74 (16)	0.005-0.2	-3	LC
293	Novaluron	100 (2)	99 (4)	0.005-0.2	-15	GC
294	Novaluron	120 (3)	110 (4)	0.005-0.2	-1	LC
295	Nuarimol	102 (4)	96 (5)	0.005-0.2	16	GC
296	Omethoate	87 (6)	81 (10)	0.005-0.2	0	LC
297	Oxadiargyl	118 (10)	120 (6)	0.005-0.2	6	LC
298	Oxadixyl	104 (15)	93 (4)	0.005-0.2	-1	GC
299	Oxadixyl	94 (6)	95 (6)	0.005-0.2	2	LC
300	Oxamyl	93 (8)	92 (9)	0.005-0.2	9	LC
301	Oxasulfuron	109 (7)	98 (4)	0.005-0.2	1	LC
302	Oxfendazole	85 (4)	83 (8)	0.005-0.2	-1	LC
303	Oxyfluorfen	120 (4)	105 (9)	0.005-0.2	1	LC

304	Paclobutrazol	109 (11)	96 (7)	0.005-0.2	17	GC
305	Paclobutrazol	114 (5)	107 (4)	0.005-0.2	7	LC
306	Paraoxon methyl	101 (6)	98 (6)	0.005-0.2	5	LC
307	Parathion	109 (1)	92 (5)	0.005-0.2	33	GC
308	Parathion-methyl	109 (3)	96 (5)	0.005-0.2	16	GC
309	Pebulate	100 (6)	88 (7)	0.005-0.2	12	GC
310	Penconazole	106 (4)	97 (6)	0.005-0.2	12	GC
311	Penconazole	115 (1)	108 (2)	0.005-0.2	4	LC
312	Pencyuron	111 (1)	107 (3)	0.005-0.2	-1	LC
313	Pendimethalin	102 (4)	91 (6)	0.005-0.2	22	GC
314	Pendimethalin	119 (5)	106 (1)	0.005-0.2	-5	LC
315	Penflufen	112 (2)	115 (1)	0.005-0.2	-1	LC
316	Penthiopyrad	103 (1)	96 (5)	0.005-0.2	29	GC
317	Penthiopyrad	118 (4)	103 (6)	0.005-0.2	7	LC
318	Permethrin	107 (2)	95 (7)	0.005-0.2	16	GC
319	Permethrin	119 (6)	105 (4)	0.005-0.2	19	LC
320	Phenthoate	116 (6)	95 (7)	0.005-0.2	14	GC
321	Phenthoate	110 (5)	117 (0)	0.005-0.2	2	LC
322	Phorate	ND	ND	-	-	GC
323	Phosalone	119 (3)	115 (2)	0.005-0.2	4	LC
324	Phosmet	103 (2)	85 (5)	0.010-0.2	-21	GC
325	Phosmet	110 (1)	108 (4)	0.005-0.2	0	LC
326	Phoxim	120 (7)	102 (4)	0.005-0.2	-2	LC
327	Picolinafen	108 (1)	96 (5)	0.005-0.2	29	GC
328	Picoxystrobin	106 (4)	102 (6)	0.005-0.2	26	GC
329	Pirimicarb	102 (1)	94 (3)	0.005-0.2	12	GC
330	Pirimicarb	95 (2)	99 (4)	0.005-0.2	2	LC
331	Pirimicarb desmethyl	88 (2)	82 (6)	0.005-0.2	-4	LC
332	Pirimiphos-methyl	112 (6)	104 (3)	0.005-0.2	11	GC
333	Pirimiphos-methyl	115 (2)	111 (4)	0.005-0.2	-1	LC
334	Prochloraz	106 (5)	103 (3)	0.005-0.2	11	LC
335	Procymidone	105 (9)	101 (4)	0.005-0.2	9	GC
336	Profenofos	99 (9)	99 (3)	0.005-0.2	17	GC
337	Profenofos	119 (3)	110 (3)	0.005-0.2	1	LC
338	Promecarb	120 (5)	112 (7)	0.005-0.2	3	LC
339	Prometon	106 (4)	96 (8)	0.005-0.2	11	GC
340	Prometryn	104 (10)	100 (7)	0.005-0.2	5	GC
341	Prometryn	113 (3)	105 (5)	0.005-0.2	-1	LC
342	Propamocarb	34 (8)	20 (6)	0.005-0.2	2	LC
343	Propaphos	117 (11)	98 (3)	0.005-0.2	-57	GC
344	Propaquizafop	115 (3)	109 (2)	0.005-0.2	2	LC
345	Propargite	120 (2)	110 (4)	0.005-0.2	3	LC
346	Propazine	109 (5)	101 (4)	0.005-0.2	10	GC
347	Propazine	110 (2)	110 (2)	0.005-0.2	-1	LC

348	Propiconazole	104 (9)	95 (3)	0.005-0.2	5	GC
349	Propiconazole	106 (19)	112 (4)	0.005-0.2	1	LC
350	Propoxur	102 (2)	111 (5)	0.005-0.2	2	LC
351	Propyzamide	107 (2)	97 (5)	0.005-0.2	13	GC
352	Propyzamide	94 (20)	98 (4)	0.005-0.2	-5	LC
353	Proquinazid	114 (4)	100 (5)	0.005-0.2	2	LC
354	Prosulfocarb	112 (7)	99 (8)	0.005-0.2	22	GC
355	Prosulfocarb	116 (3)	109 (4)	0.005-0.2	4	LC
356	Prothioconazole	ND	ND	-	-	LC
357	Prothiofos	104 (1)	92 (6)	0.005-0.2	12	GC
358	Prothiofos	119 (4)	95 (11)	0.005-0.2	-6	LC
359	Pymetrozine	38 (4)	36 (2)	0.005-0.2	-5	LC
360	Pyraclostrobin	108 (5)	93 (7)	0.005-0.2	-38	GC
361	Pyraclostrobin	115 (5)	107 (3)	0.005-0.2	4	LC
362	Pyrazophos	112 (19)	99 (4)	0.010-0.2	19	GC
363	Pyrethrin	94 (6)	106 (6)	0.005-0.2	7	LC
364	Pyridaben	ND	90 (6)	0.050-0.2	5	GC
365	Pyridaben	119 (3)	105 (5)	0.005-0.2	-4	LC
366	Pyridalyl	ND	96 (7)	0.005-0.2	7	LC
367	Pyridaphenthion	111 (2)	107 (2)	0.005-0.2	4	LC
368	Pyridate	119 (2)	100 (3)	0.005-0.2	0	LC
369	Pyrifenox	101 (6)	94 (3)	0.005-0.2	14	GC
370	Pyrimethanil	105 (9)	93 (5)	0.005-0.2	13	GC
371	Pyrimethanil	104 (4)	104 (4)	0.005-0.2	-3	LC
372	Pyriofenone	110 (5)	100 (3)	0.005-0.2	12	GC
373	Pyriofenone	100 (5)	108 (11)	0.005-0.2	-8	LC
374	Pyriproxyfen	117 (6)	99 (3)	0.010-0.2	15	GC
375	Pyriproxyfen	119 (2)	103 (7)	0.005-0.2	-7	LC
376	Quinalphos	ND	100 (2)	0.020-0.2	11	GC
377	Quinalphos	92 (8)	111 (5)	0.005-0.2	4	LC
378	Quinoclamine	101 (6)	89 (9)	0.005-0.2	2	LC
379	Quinoxyfen	97 (6)	91 (8)	0.005-0.2	7	GC
380	Quinoxyfen	107 (2)	102 (8)	0.005-0.2	-5	LC
381	Quintozene	83 (7)	87 (3)	0.005-0.2	4	GC
382	Quizalofop	99 (20)	106 (11)	0.01-0.2	10	LC
383	Quizalofop-ethyl	120 (2)	108 (2)	0.005-0.2	1	LC
384	Rotenone	119 (5)	105 (2)	0.005-0.2	10	LC
385	Secbumeton	117 (5)	96 (4)	0.010-0.2	16	GC
386	Simazine	118 (2)	106 (1)	0.005-0.2	0	LC
387	Spinetoram	79 (11)	78 (12)	0.005-0.2	7	LC
388	Spinosad	85 (7)	80 (9)	0.005-0.2	4	LC
389	Spirodiclofen	113 (6)	104 (4)	0.005-0.2	3	GC
390	Spirodiclofen	119 (1)	110 (2)	0.005-0.2	10	LC
391	Spiromesifen	108 (5)	99 (5)	0.005-0.2	13	GC

392	Spiromesifen	116 (5)	118 (2)	0.005-0.05	-13	LC
393	Spirotetramat	115 (5)	112 (4)	0.005-0.2	11	LC
394	Spiroxamine	86 (6)	85 (10)	0.005-0.2	2	LC
395	Sulfotep	113 (4)	101 (5)	0.005-0.2	5	GC
396	Sulfoxaflor	100 (7)	95 (5)	0.005-0.2	7	LC
397	Sulprofos	101 (7)	104 (5)	0.005-0.2	-50	GC
398	Tebuconazole	110 (1)	95 (5)	0.005-0.2	23	GC
399	Tebuconazole	99 (3)	103 (1)	0.005-0.2	12	LC
400	Tebufenozide	105 (6)	101 (3)	0.005-0.2	-10	LC
401	Tebufenpyrad	105 (4)	97 (6)	0.005-0.2	17	GC
402	Tebufenpyrad	120 (5)	109 (3)	0.005-0.2	-1	LC
403	Tecnazene	103 (8)	96 (5)	0.005-0.2	9	GC
404	Teflubenzuron	99 (7)	103 (3)	0.005-0.2	6	LC
405	Tefluthrin	108 (4)	100 (4)	0.005-0.2	8	GC
406	Terbufos	ND	ND	-	-	GC
407	Terbumeton	117 (16)	101 (5)	0.005-0.2	13	GC
408	Terbuthylazine	113 (0)	109 (2)	0.005-0.2	-2	LC
409	Terbutryn	100 (4)	99 (7)	0.005-0.2	9	GC
410	Terbutryn	111 (5)	103 (3)	0.005-0.2	-3	LC
411	Tetrachlorvinphos	101 (3)	92 (7)	0.005-0.2	12	GC
412	Tetraconazole	113 (7)	95 (7)	0.005-0.2	17	GC
413	Tetraconazole	119 (12)	102 (8)	0.005-0.2	5	LC
414	Tetradifon	114 (4)	102 (4)	0.005-0.2	1	GC
415	Tetramethrin	103 (2)	100 (7)	0.005-0.2	41	GC
416	Thiabendazole	71 (9)	78 (8)	0.005-0.2	7	LC
417	Thiacloprid	103 (6)	97 (7)	0.005-0.2	3	LC
418	Thiamethoxam	98 (7)	93 (6)	0.005-0.2	-1	LC
419	Thiobencarb	106 (6)	98 (4)	0.005-0.2	14	GC
420	Thiobencarb	120 (8)	115 (3)	0.005-0.2	7	LC
421	Tolclofos methyl	119 (19)	107 (10)	0.005-0.2	-2	LC
422	Tolclofos-methyl	114 (4)	105 (4)	0.005-0.2	8	GC
423	Tolfenpyrad	117 (6)	100 (3)	0.005-0.2	8	LC
424	Tolylfluanid	107 (6)	92 (11)	0.005-0.2	16	GC
425	Triadimefon	103 (4)	98 (7)	0.005-0.2	17	GC
426	Triadimenol	ND	ND	-	-	LC
427	Triallate	103 (4)	94 (6)	0.005-0.2	4	GC
428	Triallate	120 (10)	100 (3)	0.005-0.2	-3	LC
429	Triazophos	107 (6)	95 (1)	0.005-0.2	13	GC
430	Triazophos	116 (4)	111 (4)	0.005-0.2	1	LC
431	Triclocarban	111 (7)	88 (10)	0.005-0.2	10	LC
432	Tricyclazole	89 (7)	82 (9)	0.005-0.2	1	LC
433	Trifloxystrobin	109 (4)	99 (5)	0.005-0.2	20	GC
434	Trifloxystrobin	120 (3)	108 (1)	0.005-0.2	1	LC
435	Triflumizole	116 (5)	104 (4)	0.005-0.2	0	LC

436	Triflumuron	81 (1)	110 (10)	0.01-0.1	7	LC
437	Trifluralin	109 (3)	94 (6)	0.005-0.2	12	GC
438	Triticonazole	103 (8)	100 (6)	0.005-0.2	6	LC
439	Tritosulfuron	104 (5)	112 (7)	0.005-0.2	8	LC
440	Vinclozolin	115 (6)	102 (2)	0.005-0.2	1	GC
441	Vinclozolin	112 (4)	102 (20)	0.005-0.2	-98	LC
442	XMC	110 (2)	106 (4)	0.005-0.2	3	LC
443	Zoxamide	120 (2)	109 (4)	0.005-0.2	-2	LC

***See carbofuran**

ND: Not detected (below the instrumental LOQ)
GC: Gas chromatography coupled to tandem mass spectrometry
LC: Liquid chromatography coupled to tandem mass spectrometry