

Application of new chromatographic columns and study of their effectiveness

Table of contents

1. Aim and scope	1
2. Short description	1
3. Apparatus and consumables	1
4. Chemicals	1
5. Procedure	2
<u>5.1. Sample preparation</u>	2
<u>5.2. Recovery experiments for method validation</u>	2
<u>5.3. Extraction methods</u>	2
5.3.1. Tomato and orange	2
5.3.2. Avocado	3
5.3.3. Tea	3
<u>5.4. Vial preparation</u>	4
<u>5.5. Methodology</u>	4
<u>5.6. Instrumentation and analytical conditions for the LC- MS/MS system</u>	4
5.6.1. 1290 UHPLC (Agilent)	4
5.6.2. 6490 triple quadrupole system (Agilent)	5
6. Results	5
<u>6.1. Solid support in chromatographic columns</u>	6
<u>6.2. Performance comparison</u>	6
6.2.1. Retention time	7
6.2.2. Relative standard deviation	7
6.2.3. Correlation coefficients	8
6.2.4. Band broadening	8
6.2.5. Re-equilibration times	14
<u>6.3. Time savings</u>	14
<u>6.4. Conclusions</u>	16
7. References	17
APPENDIX I: Mass Transitions	18
APPENDIX II: Retention time, repeatability and linearity results	24
APPENDIX III: Total ion chromatograms	48

1. Aim and scope

This document reports the validation data for 243 pesticides included in the European Union Multi Annual Control Program (EU-MACP) and the Working Document [1,2] using a multiresidue method by LC-MS/MS in which two chromatographic columns, which differ in their solid support for the stationary phase, have been tested.

2. Short description

The retention times for 243 pesticides were experimentally determined for both chromatographic columns tested. Then, homogenous tomato, orange, avocado and tea samples were extracted using QuEChERS and modified QuEChERS procedures. The obtained extracts were used to prepare matrix-matched calibration curves with concentrations ranging between 2 µg/L and 200 µg/L. The four calibration curves were injected in the UHPLC instrument using each chromatographic column, and their performance relative to one another was studied.

3. Apparatus and consumables

- Automatic pipettes, suitable for handling volumes from 10 µL to 5000 µL and from 1 mL to 5 mL.
- Graduated 10 mL pipette.
- 50 mL and 15 mL PTFE centrifuge tubes.
- Homogenizer PolytronTM PT 10/35 GT.
- 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 at least 4000 rpm.
- Concentration workstation.
- Injection vials, 2 mL, suitable for LC and GC auto-sampler.

4. Chemicals

- Acetonitrile ultra-gradient grade
- Trisodium citrate dihydrate
- Disodium hydrogenocitrate sesquihydrate
- Sodium chloride
- Anhydrous magnesium sulphate

- Anhydrous calcium chloride
- Primary secondary amine (PSA)
- Supel QuE Z-Sep
- Ammonium formate
- Ultra-pure water
- Methanol HPLC grade
- Formic acid
- Ethyl acetate
- Pesticide standards

5. Procedure

5.1. Sample preparation

Tomato and orange samples were extracted following the QuEChERS extraction procedure including a clean-up step with PSA. The avocado sample was extracted using a modified QuEChERS procedure, for which Z-Sep was employed in the clean-up step. The extraction of the tea sample was preceded by a hydration step, prior to the modified QuEChERS procedure. The clean-up for the tea extraction method included calcium chloride and PSA.

5.2. Pesticide stock solutions and working mix solutions

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. Working mixes were prepared in 10 mL volumetric flasks by pipetting the appropriate volume of each stock solution.

5.3. Extraction methods

5.3.1. Tomato and orange

QuEChERS

1. Weigh 10 g of tomato or orange sample in a 50-mL PTFE centrifuge tube.
2. Add 10 mL acetonitrile.
3. Shake the sample in the Agytax® shaker for 4 min.
4. Add 4 g anhydrous magnesium sulphate, 1 g sodium chloride, 1 g trisodium citrate dihydrate and 0.5 g disodium hydrogencitrate sesquihydrate.

5. Shake the sample in the Agytax® shaker for 4 min.
6. Centrifuge the tubes at 4000 rpm for 5 min.
7. Transfer a 5 mL aliquot of the supernatant to a 15 mL PTFE tube containing 750 mg anhydrous magnesium sulphate and 125 mg PSA.
8. Vortex the tubes for 30 sec.
9. Centrifuge at 4000 rpm for 5 min.
10. Take 4 mL and add 40 µL of a 5 % formic acid solution in AcN (v/v).

5.3.2. Avocado

Modified QuEChERS for high fat content commodities [3]

1. Weigh 10 g of avocado sample in a 50-mL PTFE centrifuge tube.
2. Add 10 mL acetonitrile.
3. Shake the sample in the Agytax® shaker for 4 min.
4. Add 4 g anhydrous magnesium sulphate, 1 g sodium chloride, 1 g trisodium citrate dihydrate and 0.5 g disodium hydrogencitrate sesquihydrate.
5. Shake the sample in the Agytax® shaker for 4 min.
6. Centrifuge the tubes at 4000 rpm for 5 min.
7. Transfer a 5 mL aliquot of the supernatant to a 15 mL PTFE tube containing 750 mg anhydrous magnesium sulphate and 175 mg Z-Sep.
8. Vortex the tubes for 30 sec.
9. Centrifuge at 4000 rpm for 5 min.

5.3.3. Tea

Modified QuEChERS for tea [4]

1. Weigh 2 g of tea sample in a 50-mL PTFE centrifuge tube.
2. Add 4 mL of milli-Q water.
3. Vortex tube for 30 sec.
4. Wait 30 min.
5. Add 10 mL acetonitrile.
6. Shake the sample in the Agytax® shaker for 7 min.
7. Add 4 g anhydrous magnesium sulphate, 1 g sodium chloride, 1 g trisodium citrate dihydrate and 0.5 g disodium hydrogencitrate sesquihydrate.
8. Shake the sample in the Agytax® shaker for 5 min.
9. Centrifuge the tubes at 3700 rpm for 5 min.
10. Transfer a 3 mL aliquot of the supernatant to a 15 mL PTFE tube containing 150 mg of anhydrous calcium chloride and 150 mg PSA.
11. Vortex the tubes for 30 sec.
12. Centrifuge at 3700 rpm for 5 min.
13. Take 2 mL and add 30 µL of a 5 % formic acid solution in AcN (v/v).

5.4. Vial preparation

Extraction method	LC-QqQ-MS/MS
QuEChERS	
Modified QuEChERS for high fat content commodities	5-fold dilution of the extract with ultrapure water
Modified QuEChERS for tea	

During the vial preparation, dimethoate-D₆ (LC) was added as an injection internal standard.

5.5. Methodology

The LC system was 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**.

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

5.6.1. 1290 UHPLC (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: 5 µL

These parameters were used in combination with the two different chromatographic columns evaluated in this technical report.

- Column A: core-shell C8 2.1x100 mm and 1.7 µm particle size
- Column B: fully porous C8 2.1x100 mm and 1.8 µm particle size

Mobile phase gradient for pesticides analysis:

Time [min]	Mobile phase A	Mobile phase B
0	100 %	0 %
2	80 %	20 %
15	0 %	100 %
18	0 %	100 %

Re-equilibration time with initial mobile phase set for 2.5 minutes.

5.6.2. 6490 triple quadrupole system (Agilent)

- Ionisation mode: Positive mode and negative mode
- Capillary (positive and negative): 3000 V
- Nebulizer: 45 psi
- Nozzle: 400 V
- Drying gas flow: 13 L/min
- Drying gas temperature: 120 °C
- Sheath gas flow: 10 L/min
- Sheath gas temperature: 375 °C
- High Pressure RF (positive): 150 V
- High Pressure RF (negative): 110 V
- Low Pressure RF (positive): 60 V
- Low Pressure RF (negative): 60 V

6. Results

Since the objective of this technical paper is to compare different solid support for reverse phase LC columns, two were chosen whose main differentiating point was indeed the solid support employed. Both columns studied employ C8 as the stationary phase, have 2.1x100 mm dimensions and similar particle sizes, 1.7 µm and 1.8 µm. All parameters besides solid support were kept unaltered.

6.1. Solid support in chromatographic columns

Band broadening in chromatographic analyses are caused by three different sources, all of which appear in the van Deemter equation (**Eq. 1**):

$$H = 2\lambda d_p + \frac{2\gamma D_m}{u} + \frac{\omega(d_p \text{ or } d_c)^2 u}{D_m} + \frac{Rd_f^2}{D_s} \quad \text{Eq. 1}$$

The three parameters are:

1. Eddy diffusion: $2\lambda d_p$
2. Longitudinal diffusion: $\frac{2\gamma D_m}{u}$
3. Mass transfer: $\frac{\omega(d_p \text{ or } d_c)^2 u}{D_m} + \frac{Rd_f^2}{D_s}$

These three parameters ought to be minimized to reduce band broadening. In literature, columns using core-shell solid support for the packed stationary phase are described to reduce these parameters from the van Deemter equation, thus achieving lower band broadening compared to other columns employing, for instance, fully porous silica beads [5]. Core-shell solid support consists of a homogeneous, porous shell bonded to the outside surface of a solid silica particle. According to the data in the literature, shorter analysis times and reduced band broadening should be expected when using a core-shell packed column versus a fully porous silica column.

Two columns have been tested in this work: column A (core-shell C8, 2.1x100 mm and 1.7 µm particle size), a core-shell silica chromatographic column, and column B (fully porous C8, 2.1x100 mm and 1.8 µm particle size), a fully porous silica-based column.

6.2. Performance comparison

The performance of both chromatographic columns was compared using calibration curves in four different matrixes, i.e. tomato, orange, avocado and tea, in the following terms:

- Retention time (t_R) of each compound for each column and curve and the relative t_R for each compound in each matrix between column A and column B were determined.
- Relative standard deviation at a concentration of 10 µg/L.
- Correlation coefficient for the calibration curve of each compound in the different matrixes (R^2).
- Band broadening differences were checked.
- Re-equilibration times were measured for each column.

6.2.1. Retention time

All the studied analytes elute faster when using column A. On average, t_R were 93 % for column A of those of column B. The following table summarizes the average, minimum and maximum t_R values for both column A and column B. Detailed information can be found in **Appendix II, Tables 2 to 5**.

Matrix	Column	Average t_R (min)	Median t_R (min)	Minimum t_R (min)	Maximum t_R (min)
Tomato	A	9.64	10.46	1.50	14.63
	B	10.35	11.25	1.85	15.23
Orange	A	9.64	10.44	1.50	14.63
	B	10.36	11.25	1.85	15.23
Avocado	A	9.64	10.45	1.50	14.63
	B	10.35	11.25	1.85	15.24
Tea	A	9.64	10.46	1.50	14.63
	B	10.35	11.25	1.85	15.22

6.2.2. Relative standard deviation

Relative standard deviation (RSD, %) was measured by injecting three matrix-matched replicates of the pesticide standards at a concentration of 10 µg/L. No significant differences between column A and B were observed in terms of RSD values. The average RSD was 4 % for tomato, orange and avocado, and 3 % for tea. RSD values were slightly higher for the pesticides analysed using column B. Detailed information can be found in **Appendix II, Tables 2 to 5**.

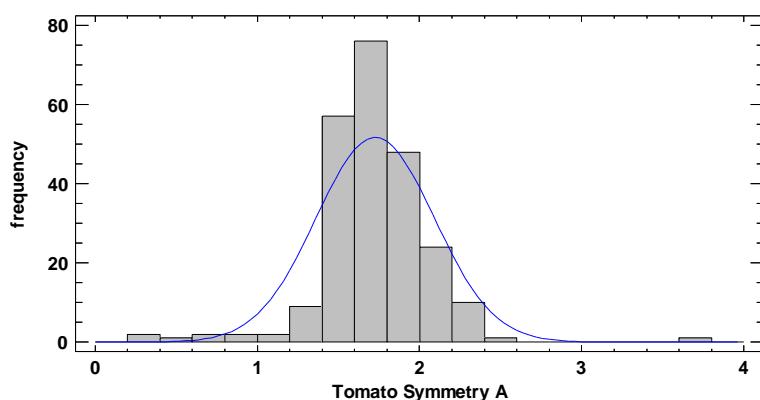
6.2.3. Correlation coefficients

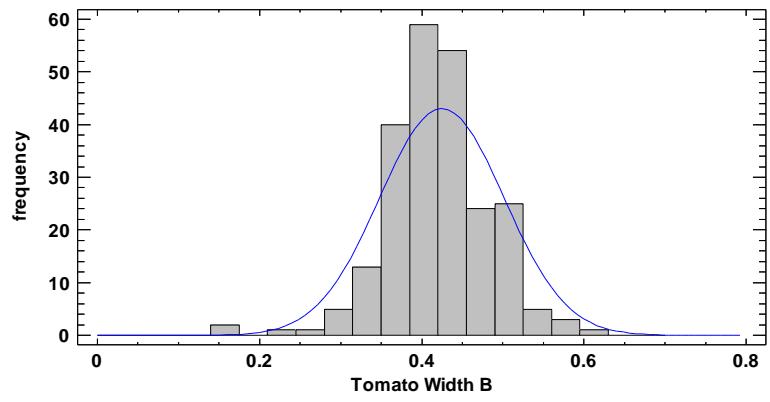
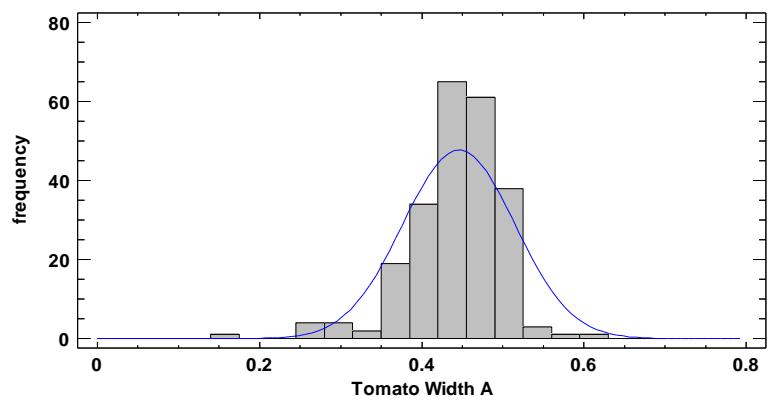
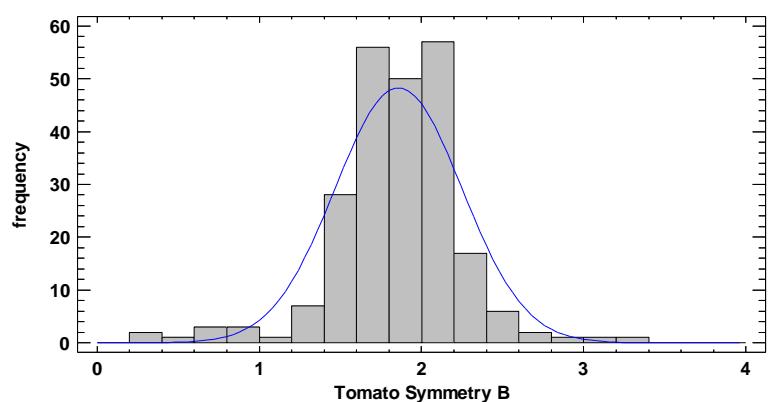
The correlation coefficients of matrix-matched calibration curves in tomato, orange, avocado and tea with concentrations ranging between 2 µg/L and 200 µg/L were obtained. The calibration points were 2, 5, 10, 20, 50, 100 and 200 µg/L, with three replicates for the 10 µg/L calibration point for the RSD study for tomato, orange and avocado, while the tea calibration curves began at 5 µg/L. No significant differences were observed, and the 243 pesticides in the four matrixes and in both columns exhibited R^2 values higher than 0.99 in all cases. Detailed information can be found in **Appendix II, Tables 2 to 5**.

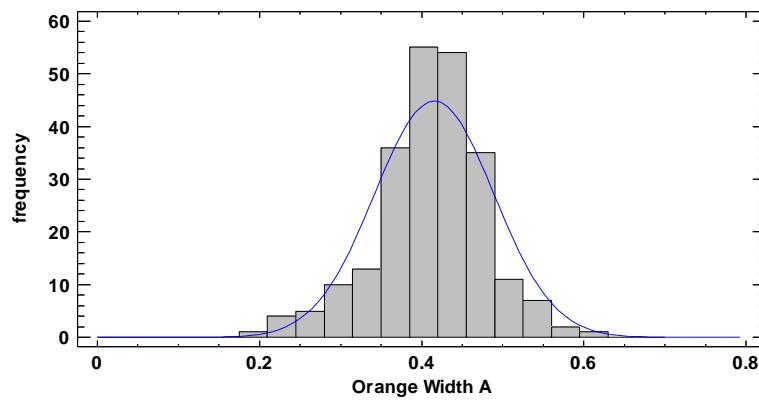
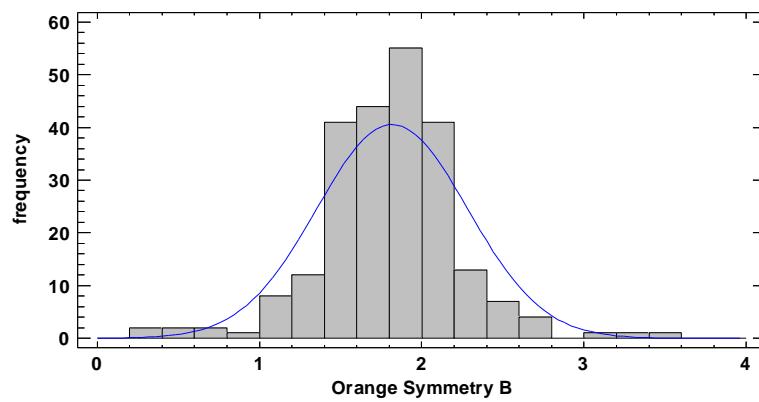
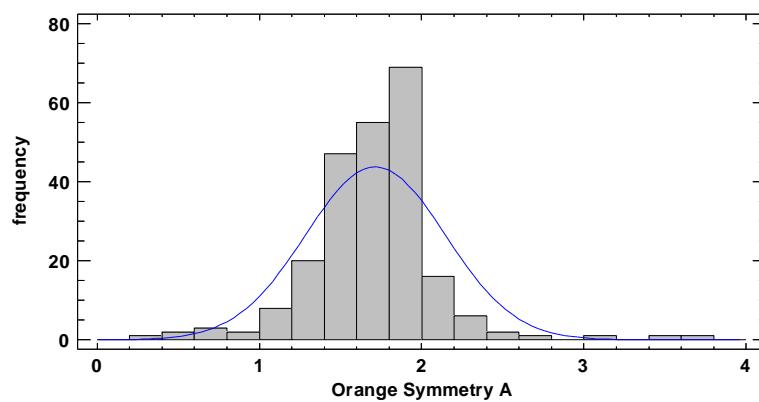
6.2.4. Band broadening

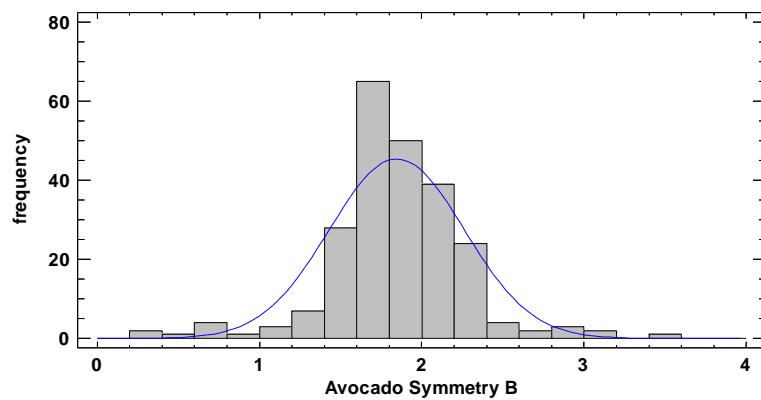
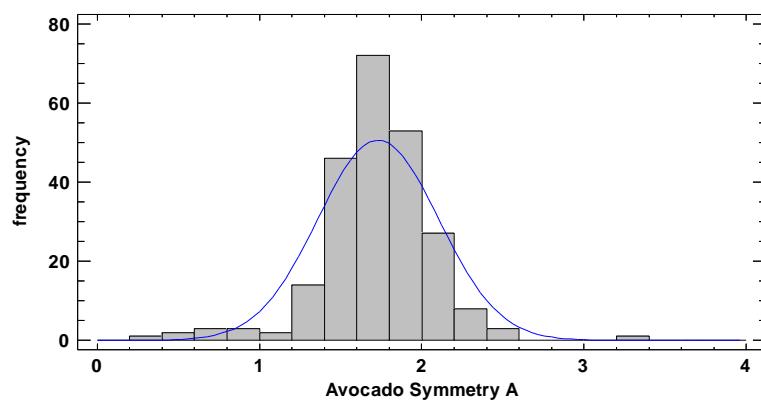
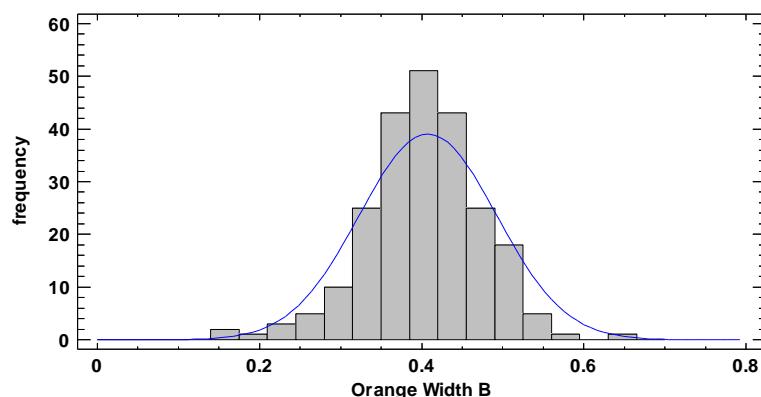
In order to check whether there were any differences in band broadening, peak symmetry and peak width were exported using the software MassHunter®, and the obtained data were treated statistically. The software sets a value of 1.0 for peaks perfectly symmetric at both sides of the apex, with values lower than 1.0 indicating some sort of peak front and values higher than 1.0 indicating some sort of peak tailing. Peak width is calculated at full width half maximum peak height. Hence, in terms of symmetry, values closer to 1.0 are preferred, whereas in terms of width, the lower the value, the narrower the peak.

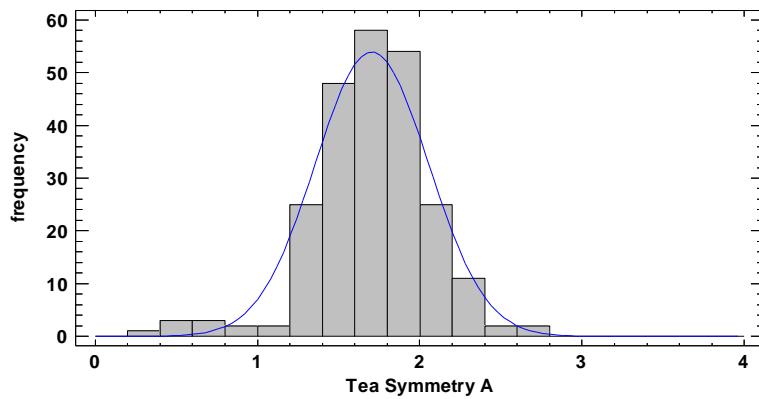
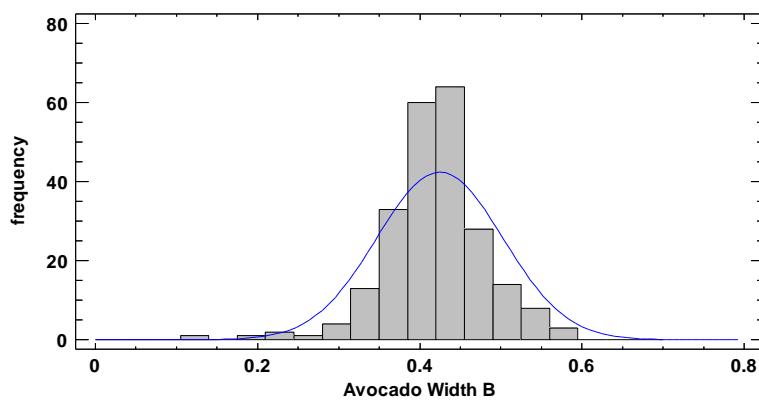
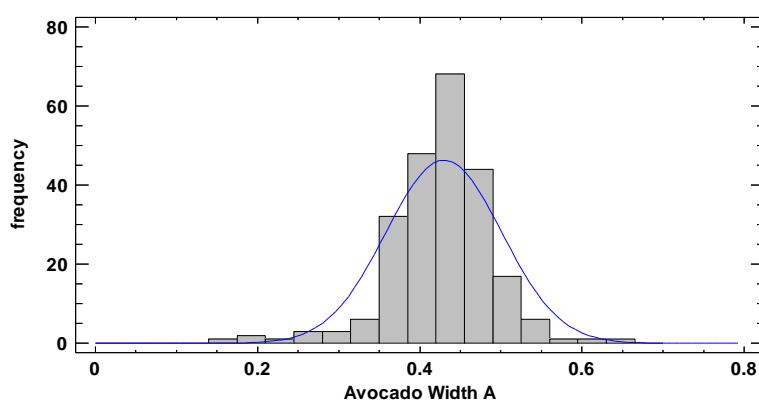
From the graphs below, it can be observed that, in broad terms, column A peaks are more symmetric than column B peaks. Furthermore, no significant differences were found in terms of peak width between column A and column B, however, column A peaks are slightly wider than column B peaks.

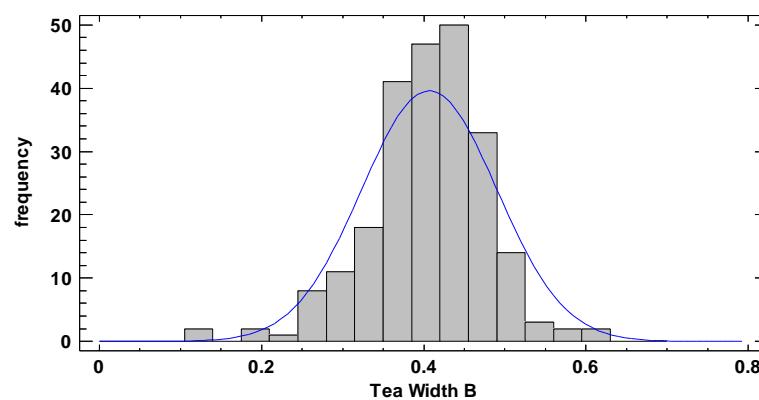
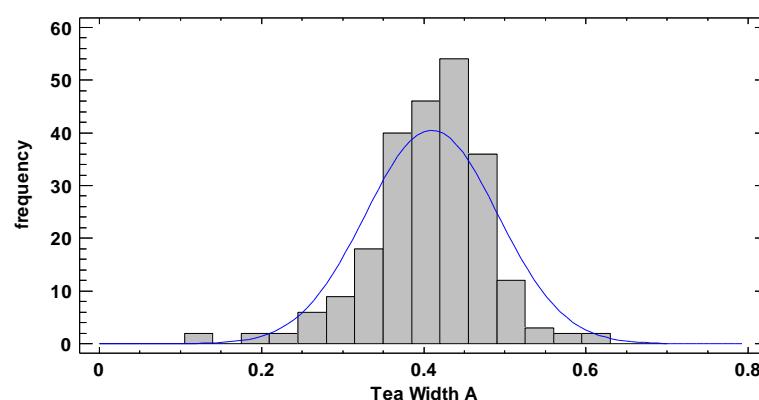
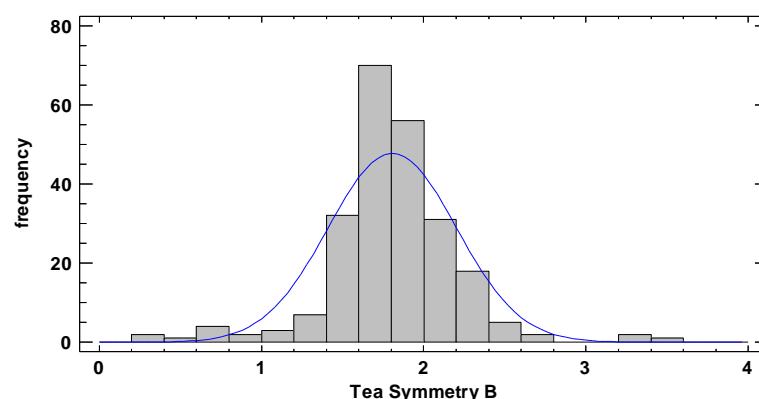












6.2.5. Re-equilibration times

The re-equilibration time for column A was 2.0 min, which was the time required for the pressure to stabilise at the initial gradient (100 % [A], 353 bar) after the end of the chromatographic analysis, during which the mobile phase is set at 0 % [A].

The re-equilibration time for column B was 2.0 min, which was the time required for the pressure to stabilise at the initial gradient (100 % [A], 348 bar) after the end of the chromatographic analysis, during which the mobile phase is set at 0 % [A].

Thus, no difference in terms of re-equilibration time was found for columns A and B with the experimental conditions employed for the elaboration of this technical report. Re-equilibration graphs for each column were obtained and are represented in **Figure 1**.

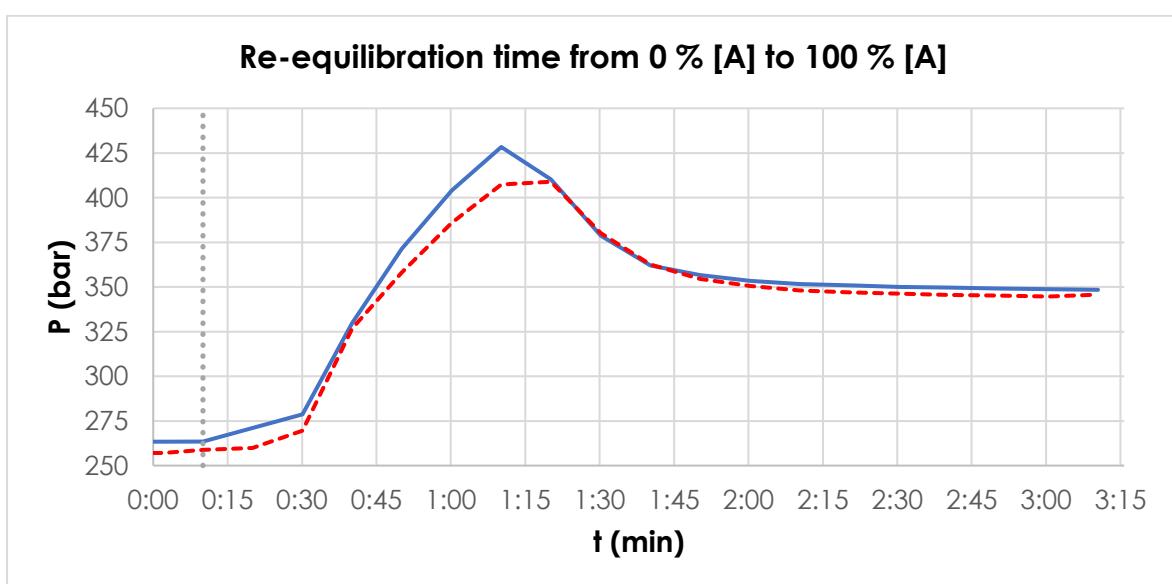


Figure 1. Pressure values for column A (blue) and B (red) after changing the mobile phase composition from 0 % [A] to 100 % [A] (gray).

6.3. Time savings

Since no differences in terms of re-equilibration time were observed, elution time is the remaining factor that could impact time and cost savings when choosing the chromatographic column. The last eluting compound in the tested method for column A is pyridalyl, with a t_R of 14.63 ± 0.4 min, and this analyte is also

the last eluting compound in column B, with a with a t_R of 15.23 ± 0.4 min. Thus, the time saved when using column A instead of column B is just 36 seconds for the tested conditions. If a different set of compounds is analysed, the analysis time expected for column A is 93 %, on average, to that of the analysis time expected for column B.

A comparison of the total ion chromatograms for a 20 µg/L standard in tomato extract can be found in **Appendix III, Figure 2**.

6.4. Conclusions

- A core-shell chromatographic column (column A) and a fully porous chromatographic column (column B) were compared.
- Matrix-matched calibration curves in tomato, orange, avocado and tea were injected using column A and column B. Relative standard deviation was studied using three replicates of the 10 µg/L calibration point.
- No significant differences in terms of linear range were observed, nor in terms of relative standard deviation.
- Retention times were shorter for the compounds studied compounds when using column A compared to column B. Retention times were an average of 93 % shorter for the studied compounds in column A compared to their retention time in column B.
- Chromatographic peaks were slightly more symmetric when using the core-shell column A. Column B provided marginally narrower chromatographic peaks than column A. No significant differences were found.
- Re-equilibration times were equal between column A and column B, so no advantage on using either column could be determined with this parameter. No significant differences were found.
- Regarding time savings, with the tested compounds, only 32.64 seconds could be saved in the analysis of the 243 compounds studied, which is just a 3.5 % time savings of the total run time for column B. No significant differences were found.

In conclusion, when considering the tested core-shell column A and the fully-porous column B, for the 243 compounds studied, no significant differences were found regarding the use of one or another chromatographic column.

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 (SANCO/12745/2013).
- [3] Lozano, A.; Rajska, Ł.; Uclés, S.; Belmonte-Valles, N.; Mezcua, M.; Fernández-Alba, A.R. Evaluation of zirconium dioxide-based sorbents to decrease the matrix effect in avocado and almond multiresidue pesticide analysis followed by gas chromatography tandem mass spectrometry. *Talanta* **2014**, 118, 68-83.
- [4] Lozano, A.; Rajska, Ł.; Belmonte-Valles, N.; Uclés, A.; Uclés, S.; Mezcua, M.; Fernández-Alba, A. R. Pesticide analysis in teas and chamomile by liquid chromatography and gas chromatography tandem mass spectrometry using a modified QuEChERS method: Validation and pilot survey in real samples. *J. Chrom. A* **2012**, 1268, 109-122.
- [5] Gritii, F.; Guiochon, G. Mass transfer kinetics, band broadening and column efficiency. *J. Chrom. A* **2012**, 1221, 2-40.

APPENDIX I: MASS TRANSITIONS

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

No.	Name	Cone voltage (V)	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)	Polarity
1	2,4-D	380	219.0	161.0	15	221.0	163.0	15	Negative
2	Acephate	380	184.0	143.0	5	184.0	125.0	15	Positive
3	Acetamiprid	380	223.0	126.0	20	223.0	56.0	15	Positive
4	Alachlor	380	270.1	238.1	10	270.1	162.0	20	Positive
5	Albendazole	380	266.2	234.1	15	266.2	191.0	20	Positive
6	Aldicarb	380	213.0	116.0	10	213.0	89.0	15	Positive
7	Aldicarb-sulfone	380	239.9	223.0	5	239.9	86.0	20	Positive
8	Aldicarb-sulfoxide	380	207.0	132.0	5	207.0	89.0	10	Positive
9	Ametoctradin	380	276.2	176.1	35	276.2	149.0	35	Positive
10	Anilofos	380	368.1	198.7	10	368.1	170.9	20	Positive
11	Atrazine	380	216.2	173.8	15	216.2	131.9	20	Positive
12	Avermectin B1a	380	890.3	567.1	10	890.3	305.1	15	Positive
13	Azinphos-ethyl	380	368.0	160.1	10	368.0	131.9	15	Positive
14	Azinphos-methyl	380	318.0	261.0	0	318.0	132.1	8	Positive
15	Azoxystrobin	380	404.0	372.0	10	404.0	344.0	20	Positive
16	BAC10	380	276.2	184.3	20	276.2	90.8	25	Positive
17	BAC8	380	248.3	156.2	15	248.3	91.2	35	Positive
18	Benalaxyl	380	326.2	208.0	15	326.2	148.0	15	Positive
19	Bendiocarb	380	224.1	166.7	5	224.1	109.1	20	Positive
20	Boscalid	380	343.0	307.1	16	343.0	272.1	32	Positive
21	Bromacil	380	261.0	204.8	25	261.0	81.1	25	Negative
22	Bromuconazole	380	378.0	159.0	20	378.0	70.0	20	Positive
23	Bupirimate	380	317.0	272.0	20	317.0	166.0	20	Positive
24	Buprofezin	380	306.0	201.0	10	306.0	116.0	15	Positive
25	Butoxycarboxim	380	240.1	222.7	5	240.1	165.9	5	Positive
26	Carbaryl	380	202.0	145.0	10	202.0	127.0	20	Positive
27	Carbendazim	380	192.0	160.0	15	192.0	132.0	20	Positive
28	Carbendazim-D ₃	380	195.1	159.8	20	195.1	131.9	20	Positive
29	Chlorantraniliprole	380	483.9	452.9	16	483.9	285.9	8	Positive
30	Chlорbromuron	380	292.9	203.9	20	292.9	181.9	15	Positive
31	Chlorfenvinphos	380	358.9	155.0	8	358.9	99.2	28	Positive
32	Chloridazon	380	222.1	104.1	20	222.1	92.0	20	Positive
33	Chlorotuluron	380	213.1	140.0	20	213.1	72.0	20	Positive
34	Chloroxuron	380	291.2	217.8	20	291.2	71.9	20	Positive
35	Chlorpyrifos	380	352.0	200.0	20	349.9	198.0	20	Positive
36	Chlorpyrifos-methyl	380	321.9	289.9	14	321.9	125.0	16	Positive
37	Chromafenozone	380	395.2	339.1	5	395.2	174.9	10	Positive
38	Clofentezine	380	303.0	138.0	12	303.0	102.0	40	Positive
39	Clomazone	380	240.1	127.8	10	240.1	124.9	20	Positive

40	Clopyralid	380	192.0	146.0	20	192.0	110.0	40	Positive
41	Coumaphos	380	363.0	307.0	20	363.0	227.0	28	Positive
42	Cyazofamid	380	325.0	261.2	10	325.0	108.1	15	Positive
43	Cyflufenamid	380	413.0	294.9	15	413.0	240.8	15	Positive
44	Cyhalofop-butyl	380	375.1	256.0	15	375.1	120.1	15	Positive
45	Cymoxanil	380	199.1	128.0	4	199.1	110.9	12	Positive
46	Cyproconazole	380	292.1	125.0	32	292.1	70.0	16	Positive
47	Cyprodinil	380	226.2	92.9	40	226.2	76.9	40	Positive
48	Cyromazine	380	167.0	125.0	15	167.0	59.9	20	Positive
49	DEET	380	192.1	119.0	15	192.1	91.1	20	Positive
50	Demeton-S-methyl	380	230.9	89.1	5	230.9	61.1	20	Positive
51	Demeton-S-methylsulfone	380	263.0	169.0	12	263.0	109.0	24	Positive
52	Demeton-S-methylsulfoxide	380	247.0	169.0	8	247.0	109.0	24	Positive
53	Desethylterbutylazine	380	202.1	146.1	15	202.1	110.1	20	Positive
54	Diazinon	380	305.0	169.0	15	305.0	153.0	20	Positive
55	Dichlorvos	380	220.8	108.8	15	220.8	78.9	30	Positive
56	Dichlorvos-D ₆	380	226.9	132.9	20	226.9	115.0	20	Positive
57	Dicrotophos	380	238.1	112.1	8	238.1	72.1	28	Positive
58	Diethofencarb	380	268.0	226.0	5	268.0	180.0	15	Positive
59	Difenoconazole	380	406.0	337.0	15	406.0	251.0	20	Positive
60	Difenoxuron	380	287.2	123.1	15	287.2	72.1	15	Positive
61	Diflubenzuron	380	311.0	158.0	8	311.0	141.0	32	Positive
62	Dimethoate	380	230.0	199.0	5	230.0	171.0	10	Positive
63	Dimethoate-D ₆	380	236.0	205.0	4	236.0	131.0	16	Positive
64	Dimethomorph	380	388.0	301.0	20	388.0	165.0	20	Positive
65	Dimethylvinphos	380	331.0	204.8	10	331.0	127.0	10	Positive
66	Diniconazole	380	326.1	159.0	28	326.1	70.0	28	Positive
67	Diuron	380	233.0	160.0	20	233.0	72.1	20	Positive
68	DMF	380	150.0	132.0	15	150.0	107.0	20	Positive
69	DMPF	380	163.0	131.9	15	163.0	122.0	15	Positive
70	Dodine	380	228.2	60.1	20	228.2	57.2	20	Positive
71	Edifenphos	380	311.1	282.8	10	311.1	110.9	20	Positive
72	Emamectin B1a benzoate	380	886.5	302.2	35	886.5	158.1	40	Positive
73	Emamectin B1b benzoate	380	872.5	157.9	30	872.5	82.0	35	Positive
74	Epoxiconazole	380	330.1	121.0	16	330.1	101.2	52	Positive
75	Ethiofencarb	380	226.1	163.8	5	226.1	107.2	10	Positive
76	Ethion	380	385.1	199.0	5	385.1	171.0	10	Positive
77	Ethiprole	380	397.0	351.0	20	397.0	254.8	40	Positive
78	Ethirimol	380	210.2	140.1	20	210.2	43.1	52	Positive
79	Ethoprophos	380	243.1	130.9	15	243.1	97.0	30	Positive
80	Etofenprox	380	394.2	359.1	10	394.2	177.3	8	Positive
81	Etoxazole	380	360.0	304.0	20	360.0	140.9	30	Positive
82	Famoxadone	380	392.0	331.0	10	392.0	238.0	20	Positive

83	Fenamidone	380	312.0	92.2	28	312.0	65.1	56	Positive
84	Fenamiphos	380	304.1	234.0	12	304.1	217.1	20	Positive
85	Fenamiphos sulfone	380	336.1	266.0	16	336.1	188.0	24	Positive
86	Fenamiphos sulfoxide	380	320.1	292.1	8	320.1	108.1	44	Positive
87	Fenarimol	380	331.0	268.0	20	331.0	259.0	20	Positive
88	Fenazaquin	380	307.3	161.3	15	307.3	147.2	15	Positive
89	Fenbendazole	380	300.1	268.0	20	300.1	158.9	35	Positive
90	Fenbuconazole	380	337.1	125.1	40	337.1	70.0	33	Positive
91	Fenhexamid	380	302.0	97.0	25	302.0	55.0	30	Positive
92	Fenobucarb	380	208.2	151.9	5	208.2	95.1	20	Positive
93	Fenoxy carb	380	302.2	116.2	5	302.2	88.2	20	Positive
94	Fenpropidin	380	274.3	147.1	30	274.3	85.8	25	Positive
95	Fenpropimorph	380	304.3	147.1	30	304.3	130.0	25	Positive
96	Fenpyrazamine	380	332.2	272.1	10	332.2	230.2	20	Positive
97	Fenthion	380	279.0	247.1	8	279.0	169.1	12	Positive
98	Fenthion sulfone	380	310.7	125.0	15	310.7	108.8	15	Positive
99	Fenthion sulfoxide	380	295.0	280.0	16	295.0	109.0	32	Positive
100	Fenuron	380	165.2	92.1	20	165.2	71.8	20	Positive
101	Fipronil	380	434.9	329.9	12	434.9	249.9	28	Negative
102	Fipronil sulfone	380	451.0	414.8	15	451.0	281.9	20	Negative
103	Flazasulfuron	380	408.0	227.0	20	408.0	182.1	20	Positive
104	Flonicamid	380	230.1	202.6	10	230.1	173.9	10	Positive
105	Fluacrypyrim	380	427.1	205.0	10	427.1	145.1	15	Positive
106	Fluazifop	380	328.2	282.2	15	328.2	254.2	20	Positive
107	Fludioxonil	380	265.9	228.9	5	265.9	158.0	20	Positive
108	Flufenoxuron	380	489.1	158.0	20	489.1	140.9	56	Positive
109	Fluometuron	380	233.2	187.9	20	233.2	72.2	20	Positive
110	Fluopicolide	380	382.9	172.9	20	382.9	144.8	20	Positive
111	Fluopyram	380	397.1	208.0	20	397.1	173.1	20	Positive
112	Fluquinconazole	380	376.0	307.1	24	376.0	108.0	56	Positive
113	Flusilazol	380	316.1	247.1	12	316.1	165.0	24	Positive
114	Fluxapyrosad	380	381.9	362.0	10	381.9	342.0	15	Positive
115	Formetanate HCl	380	222.1	165.1	8	222.1	65.1	52	Positive
116	Fosthiazate	380	284.0	227.8	10	284.0	103.8	20	Positive
117	Hexaconazole	380	314.1	159.0	30	314.1	70.1	20	Positive
118	Hexaflumuron	380	459.0	439.0	5	459.0	276.1	20	Negative
119	Hexythiazox	380	353.1	228.2	10	353.1	168.2	20	Positive
120	Imazalil	380	297.0	255.0	15	297.0	159.0	20	Positive
121	Imidacloprid	380	256.0	209.0	15	256.0	175.0	15	Positive
122	Indoxacarb	380	528.1	218.0	20	528.1	203.0	45	Positive
123	Ioxynil	380	369.8	214.8	30	369.8	126.8	30	Negative
124	Iprovalicarb	380	321.2	202.9	0	321.2	119.0	16	Positive
125	Isofenfos-methyl	380	231.0	199.0	15	231.0	121.0	15	Positive
126	Isoprocarb	380	194.1	152.0	5	194.1	95.1	15	Positive

127	Isoprothiolane	380	291.0	230.7	10	291.0	189.1	15	Positive
128	Isoproturon	380	207.2	165.1	20	207.2	72.1	10	Positive
129	Isoxaflutole	380	360.0	250.9	15	360.0	219.7	50	Positive
130	Lenacil	380	235.1	152.9	10	235.1	136.0	20	Positive
131	Linuron	380	249.0	160.1	20	249.0	133.0	36	Positive
132	Lufenuron	380	508.9	339.0	10	508.9	325.9	10	Negative
133	Malathion-D ₁₀	380	341.1	132.0	12	341.1	100.0	24	Positive
134	Mandipropamid	380	412.1	356.1	4	412.1	328.1	8	Positive
135	Mepanypirim	380	224.1	206.8	10	224.1	190.6	20	Positive
136	Metaflumizone	380	505.0	328.0	10	505.0	302.0	10	Negative
137	Metalaxyl	380	280.3	220.0	5	280.3	192.4	10	Positive
138	Metamitron	380	203.2	174.9	15	203.2	104.1	15	Positive
139	Metconazole	380	320.1	125.0	48	320.1	70.1	24	Positive
140	Methamidophos	380	142.1	125.0	10	142.1	94.1	10	Positive
141	Methidathion	380	302.9	145.0	0	302.9	85.1	15	Positive
142	Methiocarb	380	226.1	121.1	12	226.0	169.0	5	Positive
143	Methiocarb sulfone	380	275.0	201.1	5	275.0	122.0	15	Positive
144	Methiocarb sulfoxide	380	242.0	185.0	10	242.0	170.0	20	Positive
145	Methomyl	380	163.1	106.0	4	163.1	88.0	0	Positive
146	Methoxyfenozide	380	369.3	149.0	15	369.3	133.0	20	Positive
147	Metobromuron	380	259.0	170.0	15	259.0	148.0	10	Positive
148	Metolachlor	380	284.2	252.1	15	284.2	175.9	20	Positive
149	Metolcarb	380	166.0	109.1	5	166.0	91.0	20	Positive
150	Metrafenone	380	409.1	226.9	16	409.1	209.1	8	Positive
151	Monocrotophos	380	224.2	193.1	5	224.2	127.0	10	Positive
152	Monolinuron	380	215.1	148.1	8	215.1	126.0	16	Positive
153	Monuron	380	199.1	125.8	20	199.1	71.9	15	Positive
154	Neburon	380	275.1	113.9	10	275.1	88.1	12	Positive
155	Nitenpyram	380	271.0	225.0	10	271.0	99.0	10	Positive
156	Novaluron	380	490.8	470.7	5	490.8	305.1	15	Negative
157	Omethoate	380	214.1	183.0	5	214.1	125.0	20	Positive
158	Orthosulfamuron	380	425.0	226.9	15	425.0	199.1	15	Positive
159	Oxadiargyl	380	341.1	222.9	13	341.1	150.9	33	Positive
160	Oxadixyl	380	279.1	219.2	5	279.1	132.3	32	Positive
161	Oxamyl	380	237.0	90.0	5	237.0	72.0	10	Positive
162	Oxasulfuron	380	407.1	209.7	24	407.1	150.1	16	Positive
163	Oxfendazole	380	316.1	284.1	20	316.1	159.1	35	Positive
164	Paclobutrazol	380	294.1	125.2	36	294.1	70.1	16	Positive
165	Paraoxon-methyl	380	247.8	201.9	15	247.8	108.7	30	Positive
166	Penconazole	380	284.0	159.0	20	284.0	70.0	15	Positive
167	Pencycuron	380	329.1	125.1	24	329.1	89.1	60	Positive
168	Pendimethalin	380	282.1	212.1	4	282.1	194.1	16	Positive

169	Penflufen	380	318.1	234.0	10	318.1	141.0	20	Positive
170	Penthiopyrad	380	357.9	207.6	20	357.9	149.0	25	Negative
171	Permethrin	380	408.0	355.2	5	408.0	182.9	15	Positive
172	Phenthroate	380	321.0	247.1	4	321.0	79.1	44	Positive
173	Phosalone	380	368.0	182.0	8	368.0	110.9	44	Positive
174	Phosmet	380	318.0	160.0	8	318.0	133.0	36	Positive
175	Phoxim	380	299.0	129.1	4	299.0	77.1	24	Positive
176	Pirimicarb	380	239.2	182.1	15	239.2	72.2	20	Positive
177	Pirimicarb-desmethyl	380	225.1	168.1	8	225.1	72.1	20	Positive
178	Pirimiphos-methyl	380	306.2	164.2	20	306.2	108.2	20	Positive
179	Prochloraz	380	376.0	308.0	10	376.0	266.0	15	Positive
180	Profenofos	380	374.9	347.0	5	374.9	304.9	15	Positive
181	Promecarb	380	208.2	150.9	5	208.2	108.8	10	Positive
182	Prometryn	380	242.2	201.0	20	242.2	157.8	20	Positive
183	Propamocarb	380	189.2	144.1	10	189.2	102.1	15	Positive
184	Propaquizafop	380	444.1	371.0	15	444.1	99.9	20	Positive
185	Propargite	380	368.1	231.2	0	368.1	175.2	8	Positive
186	Propazine	380	230.2	187.9	15	230.2	146.0	20	Positive
187	Propiconazole	380	342.1	159.0	32	342.1	69.1	16	Positive
188	Propoxur	380	210.1	168.1	5	210.1	111.1	10	Positive
189	Propyzamide	380	256.0	190.0	10	256.0	173.0	20	Positive
190	Proquinazid	380	373.0	331.0	20	373.0	289.1	20	Positive
191	Prosulfocarb	380	252.1	128.0	10	252.1	90.9	20	Positive
192	Pymetrozine	380	218.1	105.0	20	218.1	51.0	60	Positive
193	Pyraclostrobin	380	388.1	193.8	8	388.1	163.1	20	Positive
194	Pyridaben	380	365.2	309.2	10	365.2	147.3	20	Positive
195	Pyridalyl	380	490.0	203.9	20	490.0	108.8	20	Positive
196	Pyridaphenthion	380	341.1	205.0	20	341.1	189.0	15	Positive
197	Pyridate	380	379.1	351.1	5	379.1	206.8	10	Positive
198	Pyrimethanil	380	200.0	183.0	20	200.0	107.0	20	Positive
199	Pyriofenone	380	366.1	209.0	20	366.1	183.9	20	Positive
200	Pyriproxyfen	380	322.0	185.0	20	322.0	96.0	10	Positive
201	Quinalphos	380	299.1	270.8	10	299.1	242.8	10	Positive
202	Quinoclamine	380	208.0	105.1	25	208.0	77.0	40	Positive
203	Quinoxifen	380	308.1	271.9	25	308.1	196.9	35	Positive
204	Quizalofop	380	345.0	299.0	20	345.0	254.9	35	Positive
205	Quizalofop-ethyl	380	373.1	271.2	24	373.1	255.1	36	Positive
206	Rotenone	380	395.0	213.1	20	395.0	192.1	20	Positive
207	Simazine	380	202.2	131.8	15	202.2	124.0	15	Positive
208	Spinetoram J	380	748.3	203.0	30	748.3	142.0	25	Positive
209	Spinetoram L	380	760.4	203.0	35	760.4	142.1	35	Positive
210	Spinosyn A	380	732.5	142.1	30	732.5	98.1	40	Positive

211	Spinosyn D	380	746.5	142.0	25	746.5	98.0	40	Positive
212	Spirodiclofen	380	411.1	313.0	5	411.1	71.2	15	Positive
213	Spiromesifen	380	371.0	273.0	5	371.0	255.0	20	Positive
214	Spirotetramat	380	374.2	330.3	15	374.2	270.1	20	Positive
215	Spiroxamine	380	298.0	144.0	20	298.0	100.0	20	Positive
216	Sulfoxaflor	380	278.0	153.9	20	278.0	105.1	10	Positive
217	Tebuconazole	380	308.0	125.0	20	308.0	70.0	20	Positive
218	Tebufenozide	380	353.2	296.9	5	353.2	133.1	15	Positive
219	Tebufenpyrad	380	334.2	145.1	20	334.2	117.0	47	Positive
220	Teflubenzuron	380	379.0	359.0	0	379.0	339.0	4	Negative
221	Terbutylazine	380	230.0	174.0	15	230.0	146.0	20	Positive
222	Terbutryn	380	242.2	186.2	15	242.2	91.0	20	Positive
223	Tetraconazole	380	372.0	159.0	36	372.0	70.0	20	Positive
224	Thiabendazol	380	202.0	175.0	30	202.0	131.0	40	Positive
225	Thiacloprid	380	253.0	186.0	10	253.0	126.0	20	Positive
226	Thiamethoxam	380	292.0	211.0	10	292.0	181.0	20	Positive
227	Thiobencarb	380	258.0	124.7	15	258.0	99.9	10	Positive
228	Tolclofos-methyl	380	300.9	269.0	10	300.9	125.0	15	Positive
229	Tolfenpyrad	380	384.1	197.0	25	384.1	170.9	20	Positive
230	Triadimenol	380	296.0	227.0	5	296.0	70.0	10	Positive
231	Triallate	380	306.0	145.0	25	306.0	86.0	15	Positive
232	Triazophos	380	314.1	286.2	10	314.1	162.2	20	Positive
233	Trichlorfon	380	258.9	222.5	5	258.9	108.8	20	Positive
234	Triclorcarban	380	313.0	160.0	20	313.0	126.0	20	Negative
235	Tricyclazole	380	190.1	163.0	25	190.1	136.1	35	Positive
236	Trifloxystrobin	380	409.2	206.2	10	409.2	186.2	20	Positive
237	Triflumizole	380	346.1	277.8	5	346.1	72.9	15	Positive
238	Triflumuron	380	359.0	156.0	8	359.0	139.0	32	Positive
239	Triticonazole	380	318.1	125.2	20	318.1	70.2	20	Positive
240	Tritosulfuron	380	446.0	195.0	20	446.0	145.0	40	Positive
241	Valifenalate	380	399.0	313.0	10	399.0	143.7	15	Positive
242	XMC	380	180.1	123.1	10	180.1	95.1	20	Positive
243	Zoxamide	380	336.0	187.0	16	336.0	159.0	44	Positive

APPENDIX II: RETENTION TIME, REPEatability AND LINEARITY RESULTS

Table 2. Analytical data for 243 compounds in columns A and B in tomato extract.

No.	Name	Column A			Column B			Relative t_R (A/B)
		t_R (min)	RSD (10 µg/L, n = 3) (%)	R^2	t_R (min)	RSD (10 µg/L, n = 3) (%)	R^2	
1	2,4-D	8.51	5 %	0.9961	9.48	13 %	0.9986	90 %
2	Acephate	2.29	1 %	0.9999	2.66	0 %	0.9996	86 %
3	Acetamiprid	5.29	0 %	0.9999	5.86	1 %	0.9993	90 %
4	Alachlor	10.96	4 %	0.9998	11.83	8 %	0.9979	93 %
5	Albendazole	9.14	2 %	1.0000	9.98	2 %	0.9980	92 %
6	Aldicarb	6.42	3 %	1.0000	7.36	6 %	0.9994	87 %
7	Aldicarb-sulfone	3.1	1 %	0.9996	3.57	1 %	0.9993	87 %
8	Aldicarb-sulfoxide	2.83	2 %	0.9999	3.19	1 %	0.9997	89 %
9	Ametoctradin	12.04	4 %	0.9999	12.86	4 %	0.9962	94 %
10	Anilofos	11.66	0 %	0.9983	12.43	2 %	0.9968	94 %
11	Atrazine	8.9	1 %	0.9999	9.64	2 %	0.9992	92 %
12	Avermectin B1a	13.98	16 %	0.9983	14.58	21 %	0.9903	96 %
13	Azinphos-ethyl	10.87	5 %	0.9925	11.52	4 %	0.9930	94 %
14	Azinphos-methyl	9.61	3 %	0.9999	10.24	4 %	0.9964	94 %
15	Azoxystrobin	10.05	3 %	0.9999	10.63	2 %	0.9988	95 %
16	BAC10	10.71	5 %	0.9994	11.32	7 %	0.9918	95 %
17	BAC8	9.03	2 %	0.9999	9.65	2 %	0.9986	94 %
18	Benalaxydil	11.67	3 %	0.9995	12.46	1 %	0.9954	94 %
19	Bendiocarb	7.73	1 %	1.0000	8.58	2 %	0.9990	90 %
20	Boscalid	10.16	3 %	0.9999	10.93	5 %	0.9982	93 %
21	Bromacil	7.61	4 %	0.9992	8.48	6 %	0.9994	90 %
22	Bromuconazole	10.46	3 %	1.0000	11.72	2 %	0.9968	89 %
23	Bupirimate	10.8	4 %	0.9999	11.64	4 %	0.9958	93 %
24	Buprofezin	12.69	1 %	0.9987	13.54	1 %	0.9904	94 %
25	Butoxycarboxim	3.01	3 %	0.9991	3.50	1 %	0.9989	86 %
26	Carbaryl	8.14	3 %	0.9997	8.90	1 %	0.9992	91 %
27	Carbendazim	3.61	0 %	0.9999	4.00	1 %	0.9992	90 %
28	Carbendazim-D ₃	3.58	1 %	0.9999	3.97	0 %	0.9994	90 %
29	Chlorantraniliprole	9.57	2 %	0.9998	10.30	4 %	0.9996	93 %
30	Chlorbromuron	10.11	4 %	0.9999	10.89	5 %	0.9965	93 %
31	Chlorfenvinphos	12.06	7 %	0.9983	12.65	5 %	0.9959	95 %
32	Chloridazon	5.2	1 %	0.9999	5.79	1 %	0.9992	90 %
33	Chlorotoluron	8.54	1 %	0.9999	9.40	0 %	0.9984	91 %
34	Chloroxuron	10.61	4 %	0.9998	11.35	2 %	0.9987	93 %
35	Chlorpyrifos	13.02	4 %	0.9995	13.69	2 %	0.9998	95 %
36	Chlorpyrifos-methyl	12.05	7 %	0.9992	12.76	3 %	0.9940	94 %

37	Chromafenozide	11.02	2 %	1.0000	11.74	5 %	0.9909	94 %
38	Clofentezine	11.91	8 %	0.9988	12.37	3 %	0.9918	96 %
39	Clomazone	9.6	2 %	0.9997	10.42	0 %	0.9987	92 %
40	Clopyralid	2.55	6 %	0.9996	2.99	7 %	0.9990	85 %
41	Coumaphos	11.65	7 %	0.9993	12.26	4 %	0.9934	95 %
42	Cyazofamid	11.05	5 %	0.9999	11.82	2 %	0.9967	94 %
43	Cyflufenamid	12.12	3 %	0.9979	12.79	1 %	0.9919	95 %
44	Cyhalofop-butyl	12.32	3 %	0.9961	13.02	8 %	0.9962	95 %
45	Cymoxanil	5.51	1 %	0.9998	6.29	2 %	0.9989	88 %
46	Cyproconazole	10.7	3 %	0.9999	11.45	2 %	0.9976	93 %
47	Cyprodinil	10.02	5 %	0.9999	11.56	2 %	0.9992	87 %
48	Cyromazine	1.497	1 %	1.0000	1.85	1 %	0.9999	81 %
49	DEET	9.02	3 %	0.9997	9.92	3 %	0.9983	91 %
50	Demeton-S-methyl	7.72	3 %	0.9999	8.63	4 %	0.9970	89 %
51	Demeton-S-methylsulfone	3.74	2 %	1.0000	4.24	1 %	0.9989	88 %
52	Demeton-S-methylsulfoxide	3.53	0 %	0.9999	3.98	2 %	0.9998	89 %
53	Desethylterbutylazine	8.08	1 %	0.9998	8.93	1 %	0.9980	90 %
54	Diazinon	11.74	1 %	0.9999	12.48	2 %	0.9982	94 %
55	Dichlorvos	7.52	1 %	0.9998	8.43	1 %	0.9988	89 %
56	Dichlorvos-D ₆	7.47	2 %	0.9999	8.38	1 %	0.9991	89 %
57	Dicrotophos	4.46	2 %	0.9998	4.98	1 %	0.9994	90 %
58	Diethofencarb	9.81	4 %	0.9999	10.59	3 %	0.9972	93 %
59	Difenoconazole	12.1	7 %	0.9995	12.82	7 %	0.9965	94 %
60	Difenoxturon	9.22	3 %	0.9999	9.81	1 %	0.9972	94 %
61	Diflubenzuron	11.12	2 %	0.9999	11.85	2 %	0.9956	94 %
62	Dimethoate	5.16	1 %	0.9998	5.90	0 %	0.9995	88 %
63	Dimethoate-D ₆	5.11	2 %	-	5.83	6 %	-	88 %
64	Dimethomorph	10.35	4 %	0.9990	10.97	3 %	0.9978	94 %
65	Dimethylvinphos	10.63	1 %	0.9995	11.46	1 %	0.9973	93 %
66	Diniconazole	12.12	4 %	0.9999	12.95	3 %	0.9982	94 %
67	Diuron	9.12	2 %	1.0000	9.96	4 %	0.9988	92 %
68	DMF	6.87	1 %	1.0000	7.79	1 %	0.9987	88 %
69	DMPF	4.1	6 %	0.9999	4.55	1 %	0.9993	90 %
70	Dodine	11.8	4 %	0.9969	12.49	15 %	0.9946	94 %
71	Edifenphos	11.56	4 %	0.9989	12.29	4 %	0.9981	94 %
72	Emamectin B1a benzoate	12.78	4 %	0.9996	13.33	7 %	0.9998	96 %
73	Emamectin B1b benzoate	12.5	6 %	0.9997	13.07	4 %	0.9967	96 %
74	Epoxiconazole	10.91	3 %	0.9999	11.69	7 %	0.9965	93 %
75	Ethiofencarb	8.36	3 %	0.9999	9.26	3 %	0.9991	90 %
76	Ethion	13.03	5 %	0.9994	13.70	2 %	0.9912	95 %
77	Ethiprole	10.13	3 %	0.9991	10.96	2 %	0.9989	92 %
78	Ethirimol	6.22	1 %	1.0000	7.19	0 %	0.9992	86 %
79	Ethoprophos	10.94	2 %	0.9999	11.81	2 %	0.9972	93 %

80	Etofenprox	14.26	11 %	0.9937	14.88	4 %	0.9965	96 %
81	Etoxazole	13.38	5 %	0.9991	14.00	5 %	0.9962	96 %
82	Famoxadone	11.8	11 %	0.9981	12.44	11 %	0.9947	95 %
83	Fenamidone	10.18	2 %	0.9992	10.95	4 %	0.9994	93 %
84	Fenamiphos	11.25	1 %	0.9996	12.02	4 %	0.9970	94 %
85	Fenamiphos sulfone	8.16	3 %	0.9999	8.91	0 %	0.9984	92 %
86	Fenamiphos sulfoxide	7.92	1 %	0.9998	8.67	2 %	0.9981	91 %
87	Fenarimol	10.9	5 %	0.9995	11.68	13 %	0.9939	93 %
88	Fenazaquin	13.67	7 %	0.9980	14.30	4 %	0.9919	96 %
89	Fenbendazole	10.36	2 %	0.9999	11.08	2 %	0.9958	94 %
90	Fenbuconazole	11.1	2 %	0.9997	11.85	5 %	0.9978	94 %
91	Fenhexamid	10.73	4 %	0.9997	11.59	4 %	0.9984	93 %
92	Fenobucarb	9.88	2 %	0.9996	10.77	3 %	0.9975	92 %
93	Fenoxy carb	11.29	2 %	0.9997	11.98	1 %	0.9937	94 %
94	Fenpropidin	9.52	6 %	0.9996	10.24	3 %	0.9972	93 %
95	Fenpropimorph	9.73	2 %	0.9998	10.54	2 %	0.9984	92 %
96	Fenpyrazamine	10.7	3 %	0.9999	11.43	5 %	0.9978	94 %
97	Fenthion	11.53	5 %	0.9996	12.23	5 %	0.9951	94 %
98	Fenthion sulfone	8.52	4 %	0.9994	9.16	4 %	0.9978	93 %
99	Fenthion sulfoxide	8.21	1 %	0.9998	8.85	1 %	0.9981	93 %
100	Fenuron	4.8	1 %	1.0000	5.50	1 %	0.9994	87 %
101	Fipronil	11.43	2 %	0.9996	12.17	8 %	0.9987	94 %
102	Fipronil sulfone	11.94	5 %	0.9994	12.61	2 %	0.9946	95 %
103	Flazasulfuron	9.61	1 %	0.9995	10.33	2 %	0.9980	93 %
104	Flonicamid	3.64	2 %	1.0000	4.23	2 %	0.9988	86 %
105	Fluacrypyrim	12.31	6 %	0.9990	13.01	1 %	0.9966	95 %
106	Fluazifop	10.07	4 %	0.9978	10.85	4 %	0.9976	93 %
107	Fludioxonil	10.45	8 %	0.9995	11.01	7 %	0.9939	95 %
108	Flufenoxuron	13.36	13 %	0.9717	13.98	8 %	0.9959	96 %
109	Fluometuron	8.54	2 %	0.9999	9.40	2 %	0.9987	91 %
110	Fluopicolide	10.44	5 %	0.9996	11.21	3 %	0.9962	93 %
111	Fluopyram	10.89	7 %	0.9997	11.66	5 %	0.9923	93 %
112	Fluquinconazole	10.64	3 %	0.9999	11.44	3 %	0.9941	93 %
113	Flusilazol	11.28	3 %	0.9997	12.05	4 %	0.9952	94 %
114	Fluxapyrosad	10.47	2 %	1.0000	11.20	3 %	0.9984	93 %
115	Formetanate HCl	2.53	1 %	0.9998	2.73	1 %	0.9996	93 %
116	Fosthiazate	8.53	2 %	1.0000	9.40	1 %	0.9988	91 %
117	Hexaconazole	11.82	1 %	0.9994	12.68	6 %	0.9946	93 %
118	Hexaflumuron	12.43	16 %	0.9910	13.01	15 %	0.9922	96 %
119	Hexythiazox	13.13	5 %	0.9984	13.88	7 %	0.9937	95 %
120	Imazalil	8.6	4 %	0.9999	9.36	3 %	0.9981	92 %
121	Imidacloprid	4.58	0 %	0.9999	5.11	0 %	0.9991	90 %
122	Indoxacarb	12.36	6 %	0.9994	13.03	2 %	0.9930	95 %
123	Ioxynil	9.29	2 %	0.9998	9.98	2 %	0.9997	93 %

124	Iprovalicarb	10.98	7 %	0.9996	11.76	4 %	0.9995	93 %
125	Isofenfos-methyl	11.52	3 %	0.9999	12.29	2 %	0.9966	94 %
126	Isoprocarb	8.89	0 %	1.0000	9.79	1 %	0.9991	91 %
127	Isoprothiolane	10.45	3 %	0.9984	11.13	3 %	0.9980	94 %
128	Isoproturon	8.97	2 %	0.9998	9.86	2 %	0.9985	91 %
129	Isoxaflutole	9.28	0 %	0.9999	10.05	4 %	0.9980	92 %
130	Lenacil	9.01	2 %	0.9998	9.82	8 %	0.9954	92 %
131	Linuron	9.88	5 %	0.9997	10.68	2 %	0.9988	93 %
132	Lufenuron	13.07	16 %	0.9721	13.65	22 %	0.9898	96 %
133	Malathion-D ₁₀	10.44	1 %	0.9993	11.20	4 %	0.9965	93 %
134	Mandipropamid	10.39	5 %	0.9998	11.03	4 %	0.9978	94 %
135	Mepanypirim	10.71	8 %	0.9953	11.25	10 %	0.9941	95 %
136	Metaflumizone	13	11 %	0.9902	13.57	11 %	0.9956	96 %
137	Metalaxyl	9.11	2 %	0.9996	9.97	3 %	0.9989	91 %
138	Metamitron	4.78	1 %	1.0000	5.49	3 %	0.9997	87 %
139	Metconazole	11.79	5 %	0.9998	12.62	4 %	0.9934	93 %
140	Methamidophos	1.86	0 %	0.9999	2.23	0 %	0.9996	84 %
141	Methidathion	9.42	6 %	0.9998	10.17	3 %	0.9984	93 %
142	Methiocarb	10.02	4 %	0.9999	10.85	1 %	0.9988	92 %
143	Methiocarb sulfone	5.77	1 %	1.0000	6.21	2 %	1.0000	93 %
144	Methiocarb sulfoxide	5.14	2 %	0.9998	5.54	1 %	0.9992	93 %
145	Methomyl	3.52	1 %	0.9998	3.95	2 %	0.9993	89 %
146	Methoxyfenozide	10.73	4 %	0.9984	11.45	2 %	0.9983	94 %
147	Metobromuron	8.63	3 %	0.9999	9.45	2 %	0.9993	91 %
148	Metolachlor	11.04	2 %	0.9979	11.91	2 %	0.9995	93 %
149	Metolcarb	6.95	1 %	0.9999	7.82	1 %	0.9986	89 %
150	Metrafenone	11.98	3 %	0.9996	12.73	6 %	0.9965	94 %
151	Monocrotophos	4.05	1 %	0.9999	4.55	1 %	0.9997	89 %
152	Monolinuron	8.22	2 %	0.9998	9.05	1 %	0.9985	91 %
153	Monuron	7.19	2 %	0.9999	8.06	0 %	0.9989	89 %
154	Neburon	11.41	7 %	0.9989	12.19	7 %	0.9971	94 %
155	Nitenpyram	3.24	2 %	0.9999	3.67	1 %	0.9991	88 %
156	Novaluron	12.59	9 %	0.9989	13.19	14 %	0.9976	95 %
157	Omethoate	2.63	1 %	0.9999	2.99	1 %	0.9998	88 %
158	Orthosulfamuron	9.17	6 %	0.9997	9.90	4 %	0.9942	93 %
159	Oxadiargyl	11.89	3 %	0.9997	12.65	14 %	0.9916	94 %
160	Oxadixyl	6.99	1 %	0.9992	7.76	3 %	0.9960	90 %
161	Oxamyl	3.29	2 %	0.9999	3.66	2 %	0.9996	90 %
162	Oxasulfuron	7.43	1 %	0.9999	7.99	3 %	0.9988	93 %
163	Oxfendazole	7.28	2 %	0.9999	7.82	2 %	0.9992	93 %
164	Paclobutrazol	10.38	3 %	0.9999	11.21	1 %	0.9978	93 %
165	Paraoxon-methyl	6.81	3 %	0.9997	7.57	1 %	0.9987	90 %

166	Penconazole	11.48	1 %	0.9999	12.33	3 %	0.9966	93 %
167	Pencycuron	12.12	6 %	0.9987	12.86	2 %	0.9917	94 %
168	Pendimethalin	13.11	4 %	0.9990	13.79	7 %	0.9985	95 %
169	Penflufen	11.44	6 %	0.9993	12.26	2 %	0.9987	93 %
170	Penthiopyrad	11.67	4 %	0.9997	12.43	6 %	0.9959	94 %
171	Permethrin	14.207	9 %	0.9955	14.80	2 %	0.9954	96 %
172	Phenthroate	11.47	3 %	0.9993	12.18	3 %	0.9944	94 %
173	Phosalone	11.9	6 %	0.9992	12.64	3 %	0.9976	94 %
174	Phosmet	9.71	1 %	0.9999	10.35	3 %	0.9981	94 %
175	Phoxim	11.96	3 %	0.9998	12.56	3 %	0.9923	95 %
176	Pirimicarb	6.41	1 %	0.9999	7.46	2 %	0.9990	86 %
177	Pirimicarb-desmethyl	4.51	2 %	0.9999	5.09	1 %	0.9990	89 %
178	Pirimiphos-methyl	11.75	8 %	0.9997	12.56	2 %	0.9994	94 %
179	Prochloraz	11.59	7 %	0.9993	12.38	2 %	0.9943	94 %
180	Profenofos	12.58	2 %	0.9999	13.32	1 %	0.9967	94 %
181	Promecarb	10.29	3 %	0.9999	11.13	3 %	0.9985	92 %
182	Prometryn	10.01	1 %	0.9996	10.93	6 %	0.9954	92 %
183	Propamocarb	2.73	3 %	0.9999	3.11	1 %	0.9999	88 %
184	Propaquizafop	12.64	4 %	0.9997	13.35	7 %	0.9927	95 %
185	Propargite	13.31	3 %	0.9969	14.02	8 %	0.9975	95 %
186	Propazine	9.95	0 %	0.9998	10.75	2 %	0.9995	93 %
187	Propiconazole	11.61	6 %	0.9902	12.49	3 %	0.9987	93 %
188	Propoxur	7.57	1 %	0.9999	8.46	1 %	0.9991	89 %
189	Propyzamide	10.34	6 %	0.9997	11.19	3 %	0.9978	92 %
190	Proquinazid	13.37	5 %	0.9992	14.05	8 %	0.9963	95 %
191	Prosulfocarb	12.43	3 %	0.9999	13.21	2 %	0.9954	94 %
192	Pymetrozine	2.43	10 %	0.9968	2.67	1 %	0.9995	91 %
193	Pyraclostrobin	11.81	4 %	0.9986	12.43	11 %	0.9975	95 %
194	Pyridaben	13.74	12 %	0.9913	14.43	13 %	0.9915	95 %
195	Pyridalyl	14.63	5 %	0.9993	15.23	4 %	0.9947	96 %
196	Pyridaphenthion	10.67	3 %	0.9993	11.37	1 %	0.9968	94 %
197	Pyridate	14.05	13 %	0.9937	14.68	6 %	0.9932	96 %
198	Pyrimethanil	9.06	4 %	0.9999	9.96	1 %	0.9983	91 %
199	Pyriofenone	11.94	2 %	0.9999	12.75	2 %	0.9969	94 %
200	Pyriproxyfen	12.85	5 %	0.9990	13.53	0 %	0.9970	95 %
201	Quinalphos	11.38	2 %	1.0000	12.02	4 %	0.9989	95 %
202	Quinoclamine	7.23	1 %	0.9998	7.70	1 %	0.9990	94 %
203	Quinoxifen	12.87	6 %	0.9995	13.60	8 %	0.9959	95 %
204	Quizalofop	10.96	7 %	0.9974	11.73	13 %	0.9980	93 %
205	Quizalofop-ethyl	12.42	3 %	0.9999	13.15	7 %	0.9948	94 %
206	Rotenone	11.12	6 %	0.9988	11.79	3 %	0.9952	94 %
207	Simazine	7.64	1 %	1.0000	8.31	2 %	0.9989	92 %

208	Spinetoram J	12.24	2 %	0.9995	12.95	2 %	0.9955	95 %
209	Spinetoram L	12.61	5 %	0.9983	13.26	9 %	0.9969	95 %
210	Spinosyn A	11.77	2 %	1.0000	12.47	3 %	0.9991	94 %
211	Spinosyn D	12.17	5 %	0.9996	12.82	2 %	0.9965	95 %
212	Spirodiclofen	13.61	3 %	0.9982	14.32	5 %	0.9972	95 %
213	Spiromesifen	13.41	5 %	0.9967	14.11	5 %	0.9973	95 %
214	Spirotetramat	10.89	1 %	0.9991	11.62	2 %	0.9964	94 %
215	Spiroxamine	10.14	6 %	0.9997	10.89	3 %	0.9967	93 %
216	Sulfoxaflor	5.54	1 %	0.9999	6.32	1 %	0.9980	88 %
217	Tebuconazole	11.51	2 %	0.9995	12.35	7 %	0.9949	93 %
218	Tebufenozide	11.5	1 %	0.9978	12.24	4 %	0.9966	94 %
219	Tebufenpyrad	12.71	3 %	0.9989	13.47	2 %	0.9982	94 %
220	Teflubenzuron	12.81	5 %	0.9981	13.48	4 %	0.9959	95 %
221	Terbutylazine	10.2	4 %	0.9993	10.94	4 %	0.9983	93 %
222	Terbutryn	10.14	1 %	0.9997	11.03	2 %	0.9984	92 %
223	Tetraconazole	11.05	1 %	0.9998	11.81	4 %	0.9989	94 %
224	Thiabendazol	4.4	7 %	0.9997	4.64	1 %	0.9995	95 %
225	Thiacloprid	6.02	1 %	0.9999	6.58	0 %	0.9984	91 %
226	Thiamethoxam	3.74	1 %	1.0000	4.21	1 %	0.9995	89 %
227	Thiobencarb	11.93	3 %	0.9998	12.72	4 %	0.9965	94 %
228	Tolclofos-methyl	11.9	1 %	1.0000	12.52	8 %	0.9916	95 %
229	Tolfenpyrad	12.78	10 %	0.9979	13.43	13 %	0.9914	95 %
230	Triadimenol	10.79	1 %	0.9995	11.64	7 %	0.9982	93 %
231	Triallate	13.12	3 %	0.9997	13.70	1 %	0.9901	96 %
232	Triazophos	10.76	1 %	0.9998	11.40	4 %	0.9972	94 %
233	Trichlorfon	4.98	1 %	0.9999	5.83	2 %	0.9993	85 %
234	Triclorcarban	12.31	19 %	0.9961	12.99	14 %	0.9973	95 %
235	Tricyclazole	6.33	1 %	0.9999	6.85	0 %	0.9993	92 %
236	Trifloxystrobin	12.42	3 %	0.9998	13.08	2 %	0.9954	95 %
237	Triflumizole	12.42	2 %	0.9992	13.20	4 %	0.9949	94 %
238	Triflumuron	11.89	6 %	0.9993	12.60	6 %	0.9909	94 %
239	Triticonazole	10.82	2 %	0.9992	11.68	3 %	0.9990	93 %
240	Tritosulfuron	9.81	2 %	0.9993	10.49	2 %	0.9997	93 %
241	Valifenalate	10.9	4 %	0.9998	11.60	5 %	0.9916	94 %
242	XMC	8.158	1 %	0.9999	8.99	1 %	0.9984	91 %
243	Zoxamide	11.66	2 %	0.9991	12.49	5 %	0.9960	93 %

Table 3. Analytical data for 243 compounds in columns A and B in orange extract.

No.	Name	Column A			Column B			Relative t_R (A/B)
		t_R (min)	RSD (10 µg/L, n = 3) (%)	R^2	t_R (min)	RSD (10 µg/L, n = 3) (%)	R^2	
1	2,4-D	8.50	1 %	0.9995	9.48	4 %	0.9990	90 %
2	Acephate	2.29	2 %	1.0000	2.66	1 %	1.0000	86 %
3	Acetamiprid	5.29	1 %	1.0000	5.86	1 %	1.0000	90 %
4	Alachlor	10.96	3 %	0.9991	11.83	2 %	0.9999	93 %
5	Albendazole	9.14	3 %	0.9999	10.02	2 %	0.9998	91 %
6	Aldicarb	6.43	7 %	0.9997	7.36	2 %	0.9997	87 %
7	Aldicarb-sulfone	3.11	1 %	1.0000	3.57	1 %	1.0000	87 %
8	Aldicarb-sulfoxide	2.84	1 %	0.9999	3.19	1 %	1.0000	89 %
9	Ametoctradin	12.04	7 %	0.9998	12.87	2 %	0.9999	94 %
10	Anilofos	11.65	6 %	0.9998	12.43	3 %	0.9999	94 %
11	Atrazine	8.88	3 %	0.9999	9.65	0 %	1.0000	92 %
12	Avermectin B1a	13.98	10 %	0.9991	14.59	16 %	0.9989	96 %
13	Azinphos-ethyl	10.87	3 %	0.9998	11.53	3 %	0.9999	94 %
14	Azinphos-methyl	9.59	7 %	0.9996	10.26	2 %	0.9996	94 %
15	Azoxystrobin	10.04	2 %	0.9999	10.63	1 %	0.9998	94 %
16	BAC10	10.71	5 %	0.9999	11.31	4 %	0.9998	95 %
17	BAC8	9.03	2 %	1.0000	9.65	2 %	1.0000	94 %
18	Benalaxyd	11.66	6 %	0.9998	12.46	7 %	0.9997	94 %
19	Bendiocarb	7.74	4 %	0.9999	8.59	0 %	0.9999	90 %
20	Boscalid	10.15	1 %	0.9995	10.94	4 %	0.9995	93 %
21	Bromacil	7.61	5 %	0.9998	8.49	5 %	0.9999	90 %
22	Bromuconazole	10.44	7 %	0.9990	11.72	2 %	0.9995	89 %
23	Bupirimate	10.80	2 %	0.9999	11.64	4 %	0.9997	93 %
24	Buprofezin	12.70	2 %	1.0000	13.54	2 %	0.9999	94 %
25	Butoxycarboxim	3.01	2 %	1.0000	3.50	0 %	1.0000	86 %
26	Carbaryl	8.14	2 %	0.9999	8.90	1 %	1.0000	91 %
27	Carbendazim	3.61	1 %	1.0000	3.99	1 %	0.9999	91 %
28	Carbendazim-D ₃	3.59	1 %	0.9999	3.96	1 %	1.0000	91 %
29	Chlorantraniliprole	9.57	2 %	0.9998	10.31	4 %	0.9999	93 %
30	Chlorbromuron	10.10	2 %	0.9998	10.89	5 %	0.9998	93 %
31	Chlorfenvinphos	12.05	6 %	0.9995	12.65	2 %	0.9997	95 %
32	Chloridazon	5.20	2 %	1.0000	5.79	1 %	1.0000	90 %
33	Chlorotoluron	8.54	1 %	0.9999	9.40	1 %	0.9999	91 %
34	Chloroxuron	10.61	5 %	0.9991	11.36	3 %	0.9999	93 %
35	Chlorpyrifos	13.02	1 %	0.9998	13.69	6 %	0.9996	95 %
36	Chlorpyrifos-methyl	12.05	10 %	0.9995	12.76	4 %	0.9996	94 %
37	Chromafenozone	11.01	10 %	0.9994	11.74	2 %	0.9999	94 %
38	Clofentezine	11.90	5 %	0.9997	12.37	7 %	0.9997	96 %

39	Clomazone	9.58	4 %	0.9994	10.42	2 %	0.9998	92 %
40	Clopyralid	2.55	20 %	0.9932	2.99	6 %	0.9996	85 %
41	Coumaphos	11.65	4 %	0.9997	12.26	2 %	0.9978	95 %
42	Cyazofamid	11.04	6 %	0.9996	11.82	7 %	0.9993	93 %
43	Cyflufenamid	12.12	5 %	0.9998	12.79	7 %	0.9998	95 %
44	Cyhalofop-butyl	12.31	7 %	0.9994	13.01	11 %	0.9993	95 %
45	Cymoxanil	5.51	1 %	1.0000	6.30	2 %	0.9999	87 %
46	Cyproconazole	10.70	1 %	1.0000	11.45	2 %	0.9999	93 %
47	Cyprodinil	10.02	3 %	0.9985	11.56	6 %	0.9998	87 %
48	Cyromazine	1.50	2 %	0.9999	1.85	2 %	1.0000	81 %
49	DEET	9.02	4 %	0.9999	9.89	3 %	0.9997	91 %
50	Demeton-S-methyl	7.72	2 %	0.9999	8.63	1 %	0.9999	89 %
51	Demeton-S-methylsulfone	3.74	3 %	0.9999	4.24	1 %	1.0000	88 %
52	Demeton-S-methylsulfoxide	3.54	1 %	1.0000	3.98	1 %	1.0000	89 %
53	Desethylterbutylazine	8.08	2 %	1.0000	8.93	2 %	1.0000	90 %
54	Diazinon	11.73	3 %	0.9999	12.49	4 %	0.9999	94 %
55	Dichlorvos	7.52	1 %	0.9999	8.43	1 %	0.9999	89 %
56	Dichlorvos-D ₆	7.47	2 %	1.0000	8.39	2 %	0.9999	89 %
57	Dicrotophos	4.47	1 %	0.9999	4.98	1 %	1.0000	90 %
58	Diethofencarb	9.80	2 %	0.9998	10.59	2 %	0.9997	93 %
59	Difenoconazole	12.10	5 %	0.9999	12.82	5 %	0.9996	94 %
60	Difenoxuron	9.22	1 %	0.9998	9.81	5 %	0.9998	94 %
61	Diflubenzuron	11.12	4 %	0.9999	11.85	4 %	0.9997	94 %
62	Dimethoate	5.17	-	-	5.90	-	-	88 %
63	Dimethoate-D ₆	5.10	1 %	-	5.83	1 %	-	87 %
64	Dimethomorph	10.36	2 %	0.9999	10.97	1 %	0.9997	94 %
65	Dimethylvinphos	10.63	2 %	1.0000	11.45	5 %	0.9984	93 %
66	Diniconazole	12.13	0 %	1.0000	12.95	2 %	0.9999	94 %
67	Diuron	9.12	2 %	0.9999	10.00	7 %	0.9996	91 %
68	DMF	6.87	3 %	0.9999	7.80	0 %	1.0000	88 %
69	DMPF	4.09	4 %	0.9999	4.54	0 %	0.9999	90 %
70	Dodine	11.80	2 %	0.9978	12.49	3 %	0.9989	94 %
71	Edifenphos	11.56	4 %	0.9999	12.29	7 %	0.9998	94 %
72	Emamectin B1a benzoate	12.78	3 %	0.9999	13.33	3 %	0.9998	96 %
73	Emamectin B1b benzoate	12.50	14 %	0.9990	13.07	16 %	0.9983	96 %
74	Epoxiconazole	10.91	1 %	0.9999	11.70	1 %	0.9999	93 %
75	Ethiofencarb	8.36	2 %	0.9999	9.26	4 %	0.9999	90 %
76	Ethion	13.03	3 %	0.9998	13.70	3 %	0.9998	95 %
77	Ethiprole	10.12	3 %	0.9997	10.96	3 %	0.9999	92 %
78	Ethirimol	6.22	1 %	0.9997	7.20	1 %	1.0000	86 %
79	Ethoprophos	10.94	2 %	1.0000	11.81	2 %	1.0000	93 %
80	Etofenprox	14.25	3 %	0.9998	14.89	5 %	0.9997	96 %
81	Etoxazole	13.37	4 %	0.9994	14.01	1 %	0.9985	95 %

82	Famoxadone	11.81	6 %	0.9996	12.43	9 %	0.9986	95 %
83	Fenamidone	10.18	7 %	0.9996	10.94	5 %	0.9996	93 %
84	Fenamiphos	11.24	5 %	0.9992	12.02	2 %	0.9999	94 %
85	Fenamiphos sulfone	8.16	1 %	1.0000	8.91	2 %	0.9998	92 %
86	Fenamiphos sulfoxide	7.92	2 %	1.0000	8.67	2 %	0.9998	91 %
87	Fenarimol	10.89	11 %	0.9993	11.68	8 %	0.9990	93 %
88	Fenazaquin	13.66	4 %	0.9988	14.31	7 %	0.9996	95 %
89	Fenbendazole	10.38	6 %	0.9995	11.09	2 %	0.9997	94 %
90	Fenbuconazole	11.11	13 %	0.9992	11.86	2 %	0.9999	94 %
91	Fenhexamid	10.73	6 %	0.9998	11.59	4 %	0.9998	93 %
92	Fenobucarb	9.89	6 %	0.9997	10.80	2 %	0.9999	92 %
93	Fenoxy carb	11.29	4 %	0.9999	11.98	5 %	0.9999	94 %
94	Fenpropidin	9.52	7 %	0.9997	10.24	2 %	0.9999	93 %
95	Fenpropimorph	9.73	1 %	0.9998	10.54	1 %	0.9999	92 %
96	Fenpyrazamine	10.71	5 %	0.9998	11.43	7 %	0.9997	94 %
97	Fenthion	11.53	5 %	0.9998	12.22	6 %	0.9998	94 %
98	Fenthion sulfone	8.52	2 %	0.9999	9.16	3 %	1.0000	93 %
99	Fenthion sulfoxide	8.20	1 %	1.0000	8.86	3 %	0.9999	93 %
100	Fenuron	4.80	1 %	0.9999	5.50	2 %	1.0000	87 %
101	Fipronil	11.43	8 %	0.9996	12.18	3 %	0.9997	94 %
102	Fipronil sulfone	11.93	5 %	0.9999	12.62	2 %	0.9999	95 %
103	Flazasulfuron	9.59	3 %	0.9998	10.33	1 %	0.9997	93 %
104	Flonicamid	3.65	4 %	0.9998	4.23	2 %	0.9999	86 %
105	Fluacrypyrim	12.32	2 %	0.9999	13.02	2 %	0.9999	95 %
106	Fluazifop	10.06	8 %	0.9990	10.83	5 %	0.9971	93 %
107	Fludioxonil	10.43	7 %	0.9988	11.02	11 %	0.9995	95 %
108	Flufenoxuron	13.35	9 %	0.9980	13.98	7 %	0.9996	95 %
109	Fluometuron	8.53	4 %	0.9999	9.40	2 %	0.9999	91 %
110	Fluopicolide	10.43	9 %	0.9996	11.22	7 %	0.9996	93 %
111	Fluopyram	10.89	2 %	0.9997	11.66	4 %	0.9999	93 %
112	Fluquinconazole	10.64	7 %	0.9997	11.43	5 %	0.9992	93 %
113	Flusilazol	11.27	1 %	0.9999	12.05	6 %	0.9994	94 %
114	Fluxapyrosad	10.45	5 %	0.9983	11.21	2 %	0.9999	93 %
115	Formetanate HCl	2.53	0 %	1.0000	2.73	1 %	1.0000	93 %
116	Fosthiazate	8.53	0 %	1.0000	9.40	3 %	1.0000	91 %
117	Hexaconazole	11.82	6 %	0.9972	12.69	7 %	0.9997	93 %
118	Hexaflumuron	12.43	9 %	0.9986	13.02	7 %	0.9992	95 %
119	Hexythiazox	13.13	7 %	0.9991	13.88	4 %	0.9997	95 %
120	Imazalil	8.60	3 %	0.9998	9.36	2 %	1.0000	92 %
121	Imidacloprid	4.58	1 %	1.0000	5.12	0 %	1.0000	90 %
122	Indoxacarb	12.36	6 %	0.9998	13.03	4 %	0.9999	95 %
123	Ioxynil	9.28	2 %	0.9999	9.97	4 %	0.9999	93 %
124	Iprovalicarb	10.97	7 %	0.9997	11.77	2 %	0.9998	93 %
125	Isofenfos-methyl	11.52	7 %	0.9998	12.29	7 %	0.9995	94 %

126	Isoprocarb	8.88	3 %	0.9998	9.80	5 %	0.9998	91 %
127	Isoprothiolane	10.43	6 %	0.9995	11.13	3 %	0.9997	94 %
128	Isoproturon	8.98	3 %	0.9999	9.86	3 %	0.9999	91 %
129	Isoxaflutole	9.28	2 %	1.0000	10.06	1 %	1.0000	92 %
130	Lenacil	9.01	3 %	0.9999	9.82	3 %	0.9999	92 %
131	Linuron	9.89	4 %	0.9993	10.66	1 %	0.9999	93 %
132	Lufenuron	13.07	7 %	0.9971	13.66	8 %	0.9956	96 %
133	Malathion-D ₁₀	10.42	9 %	0.9987	11.20	2 %	0.9998	93 %
134	Mandipropamid	10.40	6 %	0.9989	11.06	8 %	0.9996	94 %
135	Mepanypirim	10.71	7 %	0.9993	11.25	6 %	0.9969	95 %
136	Metaflumizone	13.01	2 %	0.9981	13.57	9 %	0.9988	96 %
137	Metalaxyl	9.12	2 %	1.0000	10.00	2 %	1.0000	91 %
138	Metamitron	4.77	5 %	0.9998	5.48	5 %	0.9999	87 %
139	Metconazole	11.78	1 %	0.9999	12.62	6 %	0.9998	93 %
140	Methamidophos	1.86	1 %	1.0000	2.22	0 %	1.0000	84 %
141	Methidathion	9.42	3 %	0.9999	10.17	1 %	0.9998	93 %
142	Methiocarb	10.02	3 %	0.9996	10.86	3 %	0.9998	92 %
143	Methiocarb sulfone	5.77	1 %	1.0000	6.21	2 %	1.0000	93 %
144	Methiocarb sulfoxide	5.14	1 %	1.0000	5.55	1 %	1.0000	93 %
145	Methomyl	3.52	2 %	1.0000	3.95	2 %	1.0000	89 %
146	Methoxyfenozide	10.73	4 %	0.9997	11.43	3 %	0.9994	94 %
147	Metobromuron	8.63	1 %	1.0000	9.45	0 %	1.0000	91 %
148	Metolachlor	11.03	2 %	1.0000	11.91	2 %	0.9998	93 %
149	Metolcarb	6.95	1 %	1.0000	7.82	2 %	0.9999	89 %
150	Metrafenone	11.97	3 %	0.9999	12.73	4 %	0.9985	94 %
151	Monocrotophos	4.06	2 %	0.9999	4.55	0 %	1.0000	89 %
152	Monolinuron	8.22	0 %	1.0000	9.05	2 %	0.9999	91 %
153	Monuron	7.19	0 %	1.0000	8.06	2 %	1.0000	89 %
154	Neburon	11.41	15 %	0.9991	12.19	11 %	0.9995	94 %
155	Nitenpyram	3.24	4 %	0.9999	3.67	1 %	0.9999	88 %
156	Novaluron	12.59	12 %	0.9983	13.19	3 %	0.9979	95 %
157	Omethoate	2.63	1 %	0.9999	2.99	1 %	0.9999	88 %
158	Orthosulfamuron	9.17	3 %	0.9998	9.88	5 %	0.9989	93 %
159	Oxadiargyl	11.88	8 %	0.9991	12.65	10 %	0.9994	94 %
160	Oxadixyl	6.99	6 %	0.9998	7.77	3 %	0.9995	90 %
161	Oxamyl	3.29	2 %	1.0000	3.66	2 %	1.0000	90 %
162	Oxasulfuron	7.44	1 %	1.0000	7.99	2 %	0.9999	93 %
163	Oxfendazole	7.29	4 %	0.9999	7.83	1 %	1.0000	93 %
164	Paclobutrazol	10.39	5 %	0.9998	11.21	1 %	0.9999	93 %
165	Paraoxon-methyl	6.81	2 %	0.9999	7.57	2 %	1.0000	90 %
166	Penconazole	11.48	5 %	0.9998	12.34	1 %	0.9996	93 %
167	Pencycuron	12.11	2 %	0.9999	12.86	2 %	0.9997	94 %

168	Pendimethalin	13.11	1 %	0.9993	13.79	5 %	0.9996	95 %
169	Penflufen	11.44	9 %	0.9996	12.26	5 %	0.9980	93 %
170	Penthiopyrad	11.66	4 %	0.9993	12.44	8 %	0.9995	94 %
171	Permethrin	14.21	4 %	0.9998	14.80	5 %	0.9997	96 %
172	Phenthroate	11.47	6 %	0.9982	12.19	3 %	0.9991	94 %
173	Phosalone	11.89	5 %	0.9995	12.64	1 %	1.0000	94 %
174	Phosmet	9.73	4 %	0.9999	10.36	3 %	0.9998	94 %
175	Phoxim	11.96	5 %	0.9996	12.56	6 %	0.9997	95 %
176	Pirimicarb	6.41	1 %	0.9999	7.46	1 %	1.0000	86 %
177	Pirimicarb-desmethyl	4.51	1 %	1.0000	5.09	1 %	1.0000	89 %
178	Pirimiphos-methyl	11.76	2 %	1.0000	12.56	2 %	0.9999	94 %
179	Prochloraz	11.60	2 %	0.9999	12.39	2 %	1.0000	94 %
180	Profenofos	12.57	5 %	0.9997	13.33	4 %	0.9999	94 %
181	Promecarb	10.26	1 %	1.0000	11.14	1 %	0.9983	92 %
182	Prometryn	10.01	2 %	0.9985	10.93	2 %	0.9998	92 %
183	Propamocarb	2.73	2 %	0.9999	3.11	0 %	0.9999	88 %
184	Propaquizafop	12.64	6 %	0.9997	13.35	7 %	0.9996	95 %
185	Propargite	13.31	4 %	0.9996	14.03	5 %	0.9993	95 %
186	Propazine	9.95	3 %	0.9991	10.74	1 %	0.9999	93 %
187	Propiconazole	11.59	5 %	0.9996	12.49	7 %	0.9997	93 %
188	Propoxur	7.56	1 %	0.9999	8.47	1 %	1.0000	89 %
189	Propyzamide	10.36	4 %	0.9998	11.20	4 %	0.9996	93 %
190	Proquinazid	13.37	5 %	0.9994	14.06	7 %	0.9995	95 %
191	Prosulfocarb	12.43	2 %	0.9999	13.21	4 %	0.9997	94 %
192	Pymetrozine	2.42	3 %	0.9974	2.67	1 %	1.0000	91 %
193	Pyraclostrobin	11.81	2 %	0.9999	12.43	5 %	0.9999	95 %
194	Pyridaben	13.74	4 %	0.9986	14.44	7 %	0.9993	95 %
195	Pyridalyl	14.63	1 %	1.0000	15.23	1 %	0.9999	96 %
196	Pyridaphenthion	10.67	1 %	0.9996	11.38	3 %	0.9999	94 %
197	Pyridate	14.05	7 %	0.9996	14.68	5 %	0.9996	96 %
198	Pyrimethanil	9.06	2 %	0.9998	9.98	5 %	0.9995	91 %
199	Pyriofenone	11.94	1 %	0.9998	12.76	6 %	0.9998	94 %
200	Pyriproxyfen	12.85	5 %	0.9998	13.54	3 %	0.9995	95 %
201	Quinalphos	11.37	4 %	0.9997	12.02	2 %	1.0000	95 %
202	Quinoclamine	7.22	2 %	0.9999	7.70	2 %	0.9999	94 %
203	Quinoxifen	12.87	2 %	1.0000	13.60	7 %	0.9997	95 %
204	Quizalofop	10.95	12 %	0.9966	11.72	9 %	0.9985	93 %
205	Quizalofop-ethyl	12.42	5 %	0.9983	13.15	5 %	0.9998	94 %
206	Rotenone	11.13	3 %	0.9998	11.79	5 %	0.9995	94 %
207	Simazine	7.64	4 %	0.9998	8.31	4 %	0.9999	92 %
208	Spinetoram J	12.24	3 %	0.9997	12.94	3 %	0.9997	95 %
209	Spinetoram L	12.62	4 %	0.9997	13.26	4 %	0.9995	95 %

210	Spinosyn A	11.76	4 %	0.9994	12.46	6 %	0.9998	94 %
211	Spinosyn D	12.16	3 %	0.9999	12.82	7 %	0.9997	95 %
212	Spirodiclofen	13.62	6 %	0.9988	14.33	6 %	0.9994	95 %
213	Spiromesifen	13.41	7 %	0.9990	14.11	2 %	0.9992	95 %
214	Spirotetramat	10.88	20 %	0.9952	11.62	3 %	0.9999	94 %
215	Spiroxamine	10.14	2 %	0.9999	10.89	4 %	0.9996	93 %
216	Sulfoxaflor	5.54	1 %	0.9999	6.32	1 %	1.0000	88 %
217	Tebuconazole	11.50	6 %	0.9998	12.35	6 %	0.9992	93 %
218	Tebufenozide	11.50	5 %	0.9981	12.24	5 %	0.9997	94 %
219	Tebufenpyrad	12.70	7 %	0.9996	13.47	8 %	0.9996	94 %
220	Teflubenzuron	12.81	8 %	0.9991	13.49	5 %	0.9998	95 %
221	Terbutylazine	10.20	5 %	0.9998	10.94	3 %	0.9985	93 %
222	Terbutryn	10.14	1 %	0.9997	11.05	4 %	0.9999	92 %
223	Tetraconazole	11.04	6 %	0.9995	11.81	5 %	0.9991	93 %
224	Thiabendazol	4.38	2 %	0.9996	4.64	1 %	1.0000	94 %
225	Thiacloprid	6.02	0 %	1.0000	6.59	0 %	1.0000	91 %
226	Thiamethoxam	3.74	1 %	1.0000	4.22	3 %	0.9999	89 %
227	Thiobencarb	11.93	4 %	0.9999	12.72	3 %	0.9997	94 %
228	Tolclofos-methyl	11.89	9 %	0.9986	12.52	17 %	0.9976	95 %
229	Tolfenpyrad	12.78	10 %	0.9987	13.44	2 %	0.9992	95 %
230	Triadimenol	10.78	5 %	0.9991	11.64	4 %	0.9997	93 %
231	Triallate	13.12	5 %	0.9998	13.70	1 %	0.9999	96 %
232	Triazophos	10.76	1 %	0.9986	11.41	8 %	0.9996	94 %
233	Trichlorfon	4.98	3 %	0.9999	5.83	1 %	1.0000	85 %
234	Triclorcarban	12.31	16 %	0.9976	13.00	19 %	0.9961	95 %
235	Tricyclazole	6.34	1 %	0.9992	6.85	0 %	0.9996	93 %
236	Trifloxystrobin	12.42	2 %	0.9996	13.09	3 %	0.9999	95 %
237	Triflumizole	12.42	3 %	0.9999	13.21	3 %	0.9998	94 %
238	Triflumuron	11.88	3 %	0.9997	12.60	3 %	0.9998	94 %
239	Triticonazole	10.81	4 %	0.9995	11.68	2 %	0.9998	93 %
240	Tritosulfuron	9.80	3 %	0.9993	10.49	7 %	0.9993	93 %
241	Valifenalate	10.90	4 %	0.9998	11.60	5 %	0.9997	94 %
242	XMC	8.15	1 %	1.0000	8.99	2 %	1.0000	91 %
243	Zoxamide	11.66	2 %	0.9992	12.49	4 %	0.9999	93 %

Table 4. Analytical data for 243 compounds in columns A and B in avocado extract.

No.	Name	Column A			Column B			Relative t_R (A/B)
		t_R (min)	RSD (10 µg/L, n = 3) (%)	R^2	t_R (min)	RSD (10 µg/L, n = 3) (%)	R^2	
1	2,4-D	8.50	4 %	0.9975	9.48	3 %	0.9990	90 %
2	Acephate	2.29	1 %	1.0000	2.66	2 %	1.0000	86 %
3	Acetamiprid	5.29	1 %	1.0000	5.86	2 %	1.0000	90 %
4	Alachlor	10.95	3 %	0.9997	11.82	5 %	0.9998	93 %
5	Albendazole	9.14	2 %	0.9999	9.98	1 %	0.9983	92 %
6	Aldicarb	6.42	6 %	0.9998	7.36	1 %	0.9999	87 %
7	Aldicarb-sulfone	3.11	1 %	1.0000	3.57	1 %	1.0000	87 %
8	Aldicarb-sulfoxide	2.84	1 %	1.0000	3.19	2 %	1.0000	89 %
9	Ametoctradin	12.04	1 %	0.9991	12.87	1 %	0.9996	94 %
10	Anilofos	11.65	3 %	0.9996	12.43	4 %	0.9987	94 %
11	Atrazine	8.90	2 %	0.9999	9.64	3 %	1.0000	92 %
12	Avermectin B1a	13.96	5 %	0.9983	14.58	6 %	0.9994	96 %
13	Azinphos-ethyl	10.87	2 %	0.9997	11.52	2 %	0.9998	94 %
14	Azinphos-methyl	9.61	1 %	1.0000	10.24	2 %	0.9995	94 %
15	Azoxystrobin	10.04	4 %	0.9990	10.62	2 %	1.0000	94 %
16	BAC10	10.71	5 %	0.9997	11.31	6 %	0.9998	95 %
17	BAC8	9.03	4 %	0.9999	9.64	3 %	1.0000	94 %
18	Benalaxyd	11.66	4 %	0.9998	12.46	6 %	0.9995	94 %
19	Bendiocarb	7.74	1 %	0.9998	8.58	1 %	0.9999	90 %
20	Boscalid	10.15	2 %	0.9998	10.94	2 %	0.9999	93 %
21	Bromacil	7.61	6 %	0.9905	8.48	3 %	0.9997	90 %
22	Bromuconazole	10.45	3 %	0.9988	11.72	3 %	0.9999	89 %
23	Bupirimate	10.80	2 %	0.9999	11.63	5 %	0.9999	93 %
24	Buprofezin	12.69	4 %	0.9999	13.54	2 %	0.9997	94 %
25	Butoxycarboxim	3.01	1 %	1.0000	3.50	0 %	1.0000	86 %
26	Carbaryl	8.14	4 %	0.9999	8.90	2 %	1.0000	91 %
27	Carbendazim	3.61	1 %	1.0000	3.99	1 %	1.0000	90 %
28	Carbendazim-D ₃	3.59	2 %	0.9999	3.97	1 %	1.0000	90 %
29	Chlorantraniliprole	9.57	2 %	1.0000	10.30	3 %	0.9998	93 %
30	Chlorbromuron	10.11	1 %	0.9999	10.89	2 %	1.0000	93 %
31	Chlorfenvinphos	12.06	5 %	0.9991	12.65	1 %	0.9999	95 %
32	Chloridazon	5.21	1 %	1.0000	5.79	0 %	1.0000	90 %
33	Chlorotoluron	8.54	1 %	1.0000	9.40	1 %	1.0000	91 %
34	Chloroxuron	10.61	2 %	0.9998	11.35	3 %	0.9999	93 %
35	Chlorpyrifos	13.02	6 %	0.9993	13.69	4 %	0.9997	95 %
36	Chlorpyrifos-methyl	12.05	4 %	0.9995	12.76	4 %	0.9994	94 %
37	Chromafenozone	11.02	3 %	0.9998	11.74	4 %	0.9991	94 %
38	Clofentezine	11.90	1 %	0.9998	12.37	2 %	0.9988	96 %

39	Clomazone	9.59	3 %	0.9998	10.42	0 %	0.9998	92 %
40	Clopyralid	2.55	9 %	0.9994	2.99	6 %	0.9997	85 %
41	Coumaphos	11.64	8 %	0.9955	12.26	3 %	0.9996	95 %
42	Cyazofamid	11.04	2 %	0.9992	11.82	5 %	0.9998	93 %
43	Cyflufenamid	12.11	7 %	0.9974	12.79	4 %	0.9998	95 %
44	Cyhalofop-butyl	12.31	7 %	0.9948	13.02	7 %	0.9966	95 %
45	Cymoxanil	5.52	2 %	1.0000	6.29	0 %	1.0000	88 %
46	Cyproconazole	10.70	8 %	0.9996	11.45	1 %	1.0000	93 %
47	Cyprodinil	10.02	4 %	0.9997	11.56	1 %	0.9998	87 %
48	Cyromazine	1.50	1 %	1.0000	1.85	0 %	1.0000	81 %
49	DEET	9.02	1 %	1.0000	9.92	3 %	0.9999	91 %
50	Demeton-S-methyl	7.72	3 %	0.9999	8.63	2 %	0.9999	89 %
51	Demeton-S-methylsulfone	3.74	1 %	1.0000	4.24	1 %	1.0000	88 %
52	Demeton-S-methylsulfoxide	3.54	2 %	1.0000	3.98	1 %	1.0000	89 %
53	Desethylterbutylazine	8.08	1 %	0.9999	8.93	2 %	1.0000	90 %
54	Diazinon	11.73	6 %	0.9998	12.48	1 %	1.0000	94 %
55	Dichlorvos	7.52	1 %	0.9999	8.43	1 %	0.9999	89 %
56	Dichlorvos-D ₆	7.47	1 %	0.9998	8.39	1 %	0.9999	89 %
57	Dicrotophos	4.47	1 %	0.9999	4.98	1 %	1.0000	90 %
58	Diethofencarb	9.81	2 %	0.9998	10.58	5 %	0.9998	93 %
59	Difenoconazole	12.09	2 %	0.9997	12.82	5 %	0.9984	94 %
60	Difenoxuron	9.22	2 %	0.9997	9.81	5 %	0.9999	94 %
61	Diflubenzuron	11.12	1 %	0.9990	11.85	3 %	1.0000	94 %
62	Dimethoate	5.17	2 %	0.9999	5.90	1 %	1.0000	88 %
63	Dimethoate-D ₆	5.11	1 %	-	5.83	1 %	-	88 %
64	Dimethomorph	10.34	4 %	0.9999	10.97	1 %	0.9998	94 %
65	Dimethylvinphos	10.62	6 %	0.9995	11.46	1 %	1.0000	93 %
66	Diniconazole	12.11	5 %	0.9996	12.95	1 %	0.9999	94 %
67	Diuron	9.12	4 %	0.9999	9.97	3 %	0.9999	91 %
68	DMF	6.87	2 %	1.0000	7.79	1 %	1.0000	88 %
69	DMPF	4.10	4 %	0.9999	4.55	1 %	1.0000	90 %
70	Dodine	11.80	5 %	0.9969	12.48	6 %	0.9961	95 %
71	Edifenphos	11.56	7 %	0.9998	12.29	5 %	0.9989	94 %
72	Emamectin B1a benzoate	12.78	2 %	0.9999	13.33	3 %	0.9999	96 %
73	Emamectin B1b benzoate	12.50	8 %	0.9992	13.07	10 %	0.9994	96 %
74	Epoxiconazole	10.91	4 %	0.9998	11.69	5 %	0.9997	93 %
75	Ethiofencarb	8.36	2 %	1.0000	9.26	2 %	0.9997	90 %
76	Ethion	13.03	6 %	0.9994	13.70	3 %	0.9993	95 %
77	Ethiprole	10.13	7 %	0.9997	10.96	4 %	0.9985	92 %
78	Ethirimol	6.22	1 %	1.0000	7.19	1 %	0.9999	86 %
79	Ethoprophos	10.94	3 %	0.9997	11.81	1 %	0.9999	93 %
80	Etofenprox	14.24	8 %	0.9990	14.89	8 %	0.9996	96 %
81	Etoxazole	13.37	5 %	0.9996	14.01	4 %	0.9998	95 %

82	Famoxadone	11.80	2 %	0.9993	12.44	3 %	0.9968	95 %
83	Fenamidone	10.18	1 %	0.9991	10.95	2 %	0.9999	93 %
84	Fenamiphos	11.24	6 %	0.9998	12.02	6 %	0.9995	94 %
85	Fenamiphos sulfone	8.16	1 %	1.0000	8.91	2 %	1.0000	92 %
86	Fenamiphos sulfoxide	7.92	2 %	1.0000	8.68	5 %	0.9999	91 %
87	Fenarimol	10.89	5 %	0.9996	11.68	3 %	0.9996	93 %
88	Fenazaquin	13.66	2 %	0.9993	14.30	4 %	0.9991	95 %
89	Fenbendazole	10.37	3 %	0.9997	11.08	6 %	0.9994	94 %
90	Fenbuconazole	11.10	6 %	0.9994	11.86	3 %	0.9999	94 %
91	Fenhexamid	10.73	4 %	0.9995	11.59	6 %	0.9997	93 %
92	Fenobucarb	9.87	2 %	0.9995	10.77	2 %	1.0000	92 %
93	Fenoxy carb	11.29	5 %	0.9998	11.98	5 %	0.9995	94 %
94	Fenpropidin	9.52	1 %	1.0000	10.24	2 %	0.9998	93 %
95	Fenpropimorph	9.72	3 %	0.9997	10.54	3 %	0.9999	92 %
96	Fenpyrazamine	10.70	5 %	0.9997	11.44	3 %	0.9999	94 %
97	Fenthion	11.53	2 %	0.9993	12.22	1 %	0.9990	94 %
98	Fenthion sulfone	8.52	4 %	0.9998	9.16	3 %	0.9999	93 %
99	Fenthion sulfoxide	8.21	1 %	1.0000	8.85	2 %	0.9999	93 %
100	Fenuron	4.80	1 %	1.0000	5.50	0 %	1.0000	87 %
101	Fipronil	11.42	3 %	1.0000	12.17	4 %	0.9999	94 %
102	Fipronil sulfone	11.93	3 %	0.9998	12.62	2 %	0.9996	95 %
103	Flazasulfuron	9.61	2 %	0.9999	10.33	1 %	0.9990	93 %
104	Flonicamid	3.65	3 %	1.0000	4.23	2 %	0.9998	86 %
105	Fluacrypyrim	12.31	3 %	0.9998	13.01	4 %	0.9999	95 %
106	Fluazifop	10.06	12 %	0.9992	10.85	7 %	0.9987	93 %
107	Fludioxonil	10.45	5 %	0.9996	11.01	7 %	0.9985	95 %
108	Flufenoxuron	13.35	2 %	0.9996	13.98	5 %	0.9996	96 %
109	Fluometuron	8.53	0 %	1.0000	9.40	2 %	1.0000	91 %
110	Fluopicolide	10.44	1 %	0.9995	11.21	3 %	0.9999	93 %
111	Fluopyram	10.89	7 %	0.9997	11.66	2 %	0.9999	93 %
112	Fluquinconazole	10.64	8 %	0.9994	11.44	5 %	0.9993	93 %
113	Flusilazol	11.27	5 %	0.9998	12.05	0 %	0.9999	94 %
114	Fluxapyrosad	10.47	3 %	0.9999	11.20	2 %	1.0000	93 %
115	Formetanate HCl	2.54	0 %	1.0000	2.73	1 %	1.0000	93 %
116	Fosthiazate	8.53	2 %	1.0000	9.40	2 %	1.0000	91 %
117	Hexaconazole	11.82	5 %	0.9998	12.69	3 %	0.9995	93 %
118	Hexaflumuron	12.43	5 %	0.9993	13.02	7 %	0.9985	95 %
119	Hexythiazox	13.13	5 %	0.9994	13.88	5 %	0.9994	95 %
120	Imazalil	8.60	2 %	0.9999	9.36	1 %	0.9999	92 %
121	Imidacloprid	4.58	1 %	1.0000	5.12	1 %	1.0000	90 %
122	Indoxacarb	12.36	4 %	0.9996	13.03	5 %	0.9998	95 %
123	Ioxynil	9.28	4 %	0.9999	9.97	1 %	0.9999	93 %
124	Iprovalicarb	10.97	21 %	0.9976	11.75	5 %	0.9992	93 %
125	Isofenfos-methyl	11.51	2 %	1.0000	12.28	1 %	0.9972	94 %

126	Isoprocarb	8.89	2 %	0.9999	9.79	4 %	0.9998	91 %
127	Isoprothiolane	10.44	3 %	0.9999	11.13	5 %	0.9997	94 %
128	Isoproturon	8.97	1 %	0.9995	9.86	3 %	0.9999	91 %
129	Isoxaflutole	9.27	2 %	0.9998	10.05	3 %	0.9998	92 %
130	Lenacil	9.00	3 %	0.9997	9.82	5 %	0.9999	92 %
131	Linuron	9.88	6 %	0.9995	10.68	2 %	1.0000	93 %
132	Lufenuron	13.08	8 %	0.9987	13.65	7 %	0.9995	96 %
133	Malathion-D ₁₀	10.44	3 %	0.9996	11.20	3 %	0.9999	93 %
134	Mandipropamid	10.39	6 %	0.9991	11.03	4 %	0.9991	94 %
135	Mepanypirim	10.71	6 %	0.9996	11.25	4 %	0.9969	95 %
136	Metaflumizone	13.00	3 %	0.9998	13.57	2 %	0.9999	96 %
137	Metalaxyl	9.12	1 %	1.0000	9.97	3 %	1.0000	91 %
138	Metamitron	4.78	11 %	0.9995	5.49	2 %	0.9998	87 %
139	Metconazole	11.78	4 %	0.9997	12.62	3 %	0.9998	93 %
140	Methamidophos	1.86	0 %	1.0000	2.22	1 %	1.0000	84 %
141	Methidathion	9.42	2 %	0.9999	10.17	5 %	0.9995	93 %
142	Methiocarb	10.02	3 %	0.9998	10.84	3 %	1.0000	92 %
143	Methiocarb sulfone	5.78	0 %	1.0000	6.21	1 %	1.0000	93 %
144	Methiocarb sulfoxide	5.15	1 %	1.0000	5.54	2 %	1.0000	93 %
145	Methomyl	3.52	1 %	0.9998	3.96	2 %	0.9999	89 %
146	Methoxyfenozide	10.73	8 %	0.9993	11.45	2 %	0.9998	94 %
147	Metobromuron	8.63	1 %	1.0000	9.45	3 %	1.0000	91 %
148	Metolachlor	11.03	3 %	0.9999	11.91	1 %	0.9997	93 %
149	Metolcarb	6.95	2 %	1.0000	7.82	0 %	1.0000	89 %
150	Metrafenone	11.97	2 %	0.9996	12.73	6 %	0.9997	94 %
151	Monocrotophos	4.06	2 %	0.9999	4.55	1 %	1.0000	89 %
152	Monolinuron	8.22	1 %	0.9999	9.05	2 %	0.9999	91 %
153	Monuron	7.19	2 %	1.0000	8.06	2 %	1.0000	89 %
154	Neburon	11.41	4 %	0.9990	12.18	3 %	0.9997	94 %
155	Nitenpyram	3.24	2 %	0.9998	3.67	2 %	1.0000	88 %
156	Novaluron	12.59	12 %	0.9988	13.19	4 %	0.9995	95 %
157	Omethoate	2.63	1 %	1.0000	2.99	1 %	1.0000	88 %
158	Orthosulfamuron	9.18	4 %	0.9999	9.89	3 %	0.9989	93 %
159	Oxadiargyl	11.88	4 %	0.9996	12.65	7 %	0.9996	94 %
160	Oxadixyl	6.99	7 %	0.9984	7.76	1 %	1.0000	90 %
161	Oxamyl	3.29	2 %	1.0000	3.65	1 %	1.0000	90 %
162	Oxasulfuron	7.44	1 %	1.0000	7.99	2 %	1.0000	93 %
163	Oxfendazole	7.29	1 %	0.9999	7.82	1 %	1.0000	93 %
164	Paclobutrazol	10.38	2 %	0.9998	11.21	3 %	0.9996	93 %
165	Paraoxon-methyl	6.81	3 %	0.9999	7.57	3 %	0.9999	90 %
166	Penconazole	11.48	2 %	0.9998	12.33	1 %	0.9999	93 %
167	Pencycuron	12.11	1 %	0.9998	12.86	4 %	0.9995	94 %

168	Pendimethalin	13.11	7 %	0.9989	13.79	5 %	0.9992	95 %
169	Penflufen	11.44	4 %	0.9994	12.26	2 %	0.9995	93 %
170	Penthiopyrad	11.66	5 %	0.9994	12.44	12 %	0.9961	94 %
171	Permethrin	14.19	1 %	0.9994	14.80	5 %	0.9999	96 %
172	Phenthroate	11.46	3 %	0.9998	12.18	5 %	0.9997	94 %
173	Phosalone	11.89	3 %	0.9993	12.64	4 %	0.9995	94 %
174	Phosmet	9.71	2 %	0.9999	10.35	2 %	0.9999	94 %
175	Phoxim	11.96	2 %	0.9988	12.56	5 %	0.9996	95 %
176	Pirimicarb	6.41	0 %	1.0000	7.46	3 %	1.0000	86 %
177	Pirimicarb-desmethyl	4.51	0 %	1.0000	5.09	1 %	1.0000	89 %
178	Pirimiphos-methyl	11.74	3 %	0.9999	12.56	4 %	0.9999	93 %
179	Prochloraz	11.59	2 %	1.0000	12.38	2 %	0.9997	94 %
180	Profenofos	12.57	3 %	0.9996	13.32	3 %	0.9996	94 %
181	Promecarb	10.28	6 %	0.9997	11.13	2 %	0.9999	92 %
182	Prometryn	10.00	6 %	0.9998	10.92	5 %	0.9996	92 %
183	Propamocarb	2.74	2 %	0.9998	3.10	1 %	0.9999	88 %
184	Propaquizafop	12.63	2 %	0.9999	13.34	3 %	0.9996	95 %
185	Propargite	13.31	6 %	0.9992	14.02	7 %	0.9978	95 %
186	Propazine	9.95	1 %	0.9999	10.75	4 %	0.9984	93 %
187	Propiconazole	11.59	7 %	0.9968	12.49	3 %	0.9999	93 %
188	Propoxur	7.57	1 %	1.0000	8.46	2 %	0.9999	89 %
189	Propyzamide	10.33	7 %	0.9997	11.20	3 %	0.9998	92 %
190	Proquinazid	13.37	4 %	0.9994	14.05	2 %	0.9997	95 %
191	Prosulfocarb	12.43	1 %	0.9997	13.21	2 %	1.0000	94 %
192	Pymetrozine	2.43	14 %	0.9991	2.67	1 %	1.0000	91 %
193	Pyraclostrobin	11.80	8 %	0.9993	12.43	5 %	0.9998	95 %
194	Pyridaben	13.74	7 %	0.9995	14.43	0 %	0.9999	95 %
195	Pyridalyl	14.63	2 %	0.9999	15.24	2 %	0.9999	96 %
196	Pyridaphenthion	10.66	2 %	0.9990	11.38	2 %	1.0000	94 %
197	Pyridate	14.04	1 %	0.9991	14.68	5 %	0.9975	96 %
198	Pyrimethanil	9.06	3 %	0.9998	9.96	4 %	0.9999	91 %
199	Pyriofenone	11.93	3 %	0.9980	12.76	4 %	0.9995	93 %
200	Pyriproxyfen	12.85	3 %	0.9995	13.53	7 %	0.9992	95 %
201	Quinalphos	11.37	1 %	0.9995	12.02	4 %	0.9998	95 %
202	Quinoclamine	7.23	2 %	1.0000	7.70	4 %	0.9999	94 %
203	Quinoxifen	12.87	3 %	0.9997	13.60	3 %	0.9993	95 %
204	Quizalofop	10.95	4 %	0.9993	11.72	16 %	0.9989	93 %
205	Quizalofop-ethyl	12.41	2 %	0.9997	13.15	3 %	0.9990	94 %
206	Rotenone	11.12	3 %	0.9992	11.79	1 %	1.0000	94 %
207	Simazine	7.64	1 %	0.9995	8.31	2 %	1.0000	92 %
208	Spinetoram J	12.24	5 %	0.9992	12.94	0 %	0.9998	95 %
209	Spinetoram L	12.61	4 %	0.9997	13.26	3 %	0.9999	95 %

210	Spinosyn A	11.76	5 %	0.9995	12.46	3 %	0.9999	94 %
211	Spinosyn D	12.16	7 %	0.9994	12.82	5 %	0.9996	95 %
212	Spirodiclofen	13.61	2 %	0.9997	14.32	4 %	0.9998	95 %
213	Spiromesifen	13.41	9 %	0.9987	14.11	8 %	0.9992	95 %
214	Spirotetramat	10.88	2 %	0.9998	11.62	2 %	0.9999	94 %
215	Spiroxamine	10.14	5 %	0.9997	10.88	2 %	0.9999	93 %
216	Sulfoxaflor	5.54	1 %	0.9999	6.32	2 %	1.0000	88 %
217	Tebuconazole	11.50	4 %	0.9997	12.34	2 %	0.9984	93 %
218	Tebufenozide	11.50	6 %	0.9977	12.24	8 %	0.9988	94 %
219	Tebufenpyrad	12.70	4 %	0.9993	13.47	4 %	0.9995	94 %
220	Teflubenzuron	12.81	6 %	0.9979	13.48	4 %	0.9994	95 %
221	Terbutylazine	10.20	1 %	0.9999	10.94	2 %	0.9996	93 %
222	Terbutryn	10.13	4 %	0.9999	11.03	2 %	0.9999	92 %
223	Tetraconazole	11.05	5 %	0.9988	11.82	7 %	0.9998	94 %
224	Thiabendazol	4.41	1 %	0.9999	4.64	0 %	1.0000	95 %
225	Thiacloprid	6.02	1 %	1.0000	6.58	0 %	1.0000	92 %
226	Thiamethoxam	3.74	2 %	1.0000	4.21	1 %	1.0000	89 %
227	Thiobencarb	11.93	4 %	0.9999	12.72	1 %	0.9999	94 %
228	Tolclofos-methyl	11.90	3 %	0.9996	12.52	3 %	0.9992	95 %
229	Tolfenpyrad	12.78	8 %	0.9989	13.43	4 %	0.9991	95 %
230	Triadimenol	10.78	2 %	0.9996	11.64	1 %	1.0000	93 %
231	Triallate	13.12	2 %	0.9980	13.70	5 %	0.9997	96 %
232	Triazophos	10.76	3 %	0.9994	11.40	2 %	0.9997	94 %
233	Trichlorfon	4.97	2 %	1.0000	5.83	0 %	1.0000	85 %
234	Triclorcarban	12.30	13 %	0.9991	13.00	6 %	0.9996	95 %
235	Tricyclazole	6.34	0 %	1.0000	6.85	1 %	1.0000	93 %
236	Trifloxystrobin	12.41	3 %	0.9995	13.09	2 %	0.9999	95 %
237	Triflumizole	12.41	2 %	0.9993	13.20	5 %	0.9995	94 %
238	Triflumuron	11.88	1 %	0.9994	12.60	6 %	0.9978	94 %
239	Triticonazole	10.81	2 %	0.9972	11.67	6 %	0.9994	93 %
240	Tritosulfuron	9.80	7 %	0.9996	10.50	4 %	0.9995	93 %
241	Valifenalate	10.90	9 %	0.9995	11.60	1 %	0.9997	94 %
242	XMC	8.15	1 %	1.0000	8.99	2 %	1.0000	91 %
243	Zoxamide	11.66	6 %	0.9994	12.49	5 %	0.9977	93 %

Table 5. Analytical data for 243 compounds in columns A and B in tea extract.

No.	Name	Column A			Column B			Relative t_R (A/B)
		t_R (min)	RSD (%)	R^2	t_R (min)	RSD (%)	R^2	
1	2,4-D	8.49	7 %	0.9995	9.48	6 %	0.9997	90 %
2	Acephate	2.29	0 %	0.9998	2.66	1 %	0.9998	86 %
3	Acetamiprid	5.29	0 %	0.9998	5.86	1 %	0.9999	90 %
4	Alachlor	10.94	6 %	0.9989	11.82	2 %	0.9997	93 %
5	Albendazole	9.14	1 %	0.9995	9.98	2 %	0.9988	92 %
6	Aldicarb	6.42	6 %	0.9998	7.36	8 %	0.9995	87 %
7	Aldicarb-sulfone	3.11	1 %	0.9998	3.57	1 %	0.9999	87 %
8	Aldicarb-sulfoxide	2.84	1 %	0.9999	3.19	2 %	0.9999	89 %
9	Ametoctradin	12.04	5 %	0.9996	12.87	6 %	0.9995	94 %
10	Anilofos	11.65	1 %	1.0000	12.43	5 %	0.9989	94 %
11	Atrazine	8.90	2 %	0.9999	9.64	2 %	0.9999	92 %
12	Avermectin B1a	13.98	14 %	0.9987	14.58	23 %	0.9953	96 %
13	Azinphos-ethyl	10.87	6 %	0.9997	11.51	8 %	0.9975	94 %
14	Azinphos-methyl	9.62	3 %	0.9996	10.24	5 %	0.9993	94 %
15	Azoxystrobin	10.04	2 %	0.9999	10.62	5 %	0.9999	95 %
16	BAC10	10.71	5 %	0.9998	11.31	1 %	0.9998	95 %
17	BAC8	9.03	2 %	0.9999	9.65	2 %	0.9998	94 %
18	Benalaxyd	11.66	3 %	0.9999	12.46	6 %	0.9993	94 %
19	Bendiocarb	7.74	1 %	1.0000	8.58	4 %	0.9999	90 %
20	Boscalid	10.15	1 %	0.9998	10.93	2 %	0.9998	93 %
21	Bromacil	7.61	2 %	0.9997	8.49	4 %	0.9998	90 %
22	Bromuconazole	10.46	4 %	0.9992	11.72	3 %	0.9997	89 %
23	Bupirimate	10.79	3 %	0.9997	11.63	2 %	0.9998	93 %
24	Buprofezin	12.69	2 %	0.9995	13.54	4 %	0.9997	94 %
25	Butoxycarboxim	3.04	3 %	0.9999	3.50	1 %	0.9988	87 %
26	Carbaryl	8.13	1 %	0.9997	8.90	4 %	0.9995	91 %
27	Carbendazim	3.60	3 %	0.9998	4.00	0 %	0.9999	90 %
28	Carbendazim-D ₃	3.59	2 %	0.9999	3.98	1 %	1.0000	90 %
29	Chlorantraniliprole	9.57	0 %	1.0000	10.29	3 %	0.9999	93 %
30	Chlorbromuron	10.11	2 %	1.0000	10.89	7 %	0.9997	93 %
31	Chlorfenvinphos	12.05	17 %	0.9987	12.65	2 %	0.9998	95 %
32	Chloridazon	5.21	2 %	0.9999	5.79	1 %	0.9999	90 %
33	Chlorotoluron	8.54	1 %	1.0000	9.40	1 %	0.9998	91 %
34	Chloroxuron	10.61	9 %	0.9988	11.35	3 %	0.9999	93 %
35	Chlorpyrifos	13.01	1 %	0.9992	13.69	2 %	0.9993	95 %
36	Chlorpyrifos-methyl	12.05	3 %	0.9991	12.76	7 %	0.9985	94 %
37	Chromafenozone	11.02	2 %	0.9999	11.74	5 %	0.9997	94 %
38	Clofentezine	11.90	4 %	0.9988	12.37	4 %	0.9992	96 %
39	Clomazone	9.59	2 %	1.0000	10.42	2 %	0.9999	92 %

40	Clopyralid	2.53	6 %	0.9997	3.04	12 %	0.9984	83 %
41	Coumaphos	11.65	6 %	0.9976	12.26	2 %	0.9991	95 %
42	Cyazofamid	11.04	1 %	0.9999	11.82	3 %	0.9997	93 %
43	Cyflufenamid	12.11	5 %	0.9992	12.79	4 %	0.9998	95 %
44	Cyhalofop-butyl	12.31	3 %	0.9997	13.01	3 %	0.9969	95 %
45	Cymoxanil	5.52	2 %	0.9997	6.29	1 %	0.9998	88 %
46	Cyproconazole	10.69	3 %	0.9998	11.45	1 %	0.9999	93 %
47	Cyprodinil	10.02	10 %	0.9986	11.55	7 %	0.9996	87 %
48	Cyromazine	1.50	3 %	0.9997	1.85	1 %	0.9999	81 %
49	DEET	9.02	2 %	0.9999	9.92	0 %	0.9998	91 %
50	Demeton-S-methyl	7.72	4 %	0.9996	8.63	2 %	0.9997	89 %
51	Demeton-S-methylsulfone	3.75	2 %	0.9995	4.24	2 %	0.9998	89 %
52	Demeton-S-methylsulfoxide	3.54	1 %	1.0000	3.98	1 %	0.9999	89 %
53	Desethylterbutylazine	8.08	2 %	0.9999	8.93	2 %	0.9997	90 %
54	Diazinon	11.73	6 %	0.9996	12.49	2 %	0.9998	94 %
55	Dichlorvos	7.52	3 %	0.9999	8.43	1 %	0.9999	89 %
56	Dichlorvos-D ₆	7.47	3 %	0.9999	8.38	3 %	0.9999	89 %
57	Dicrotophos	4.47	1 %	0.9912	4.98	14 %	0.9982	90 %
58	Diethofencarb	9.80	1 %	0.9999	10.58	2 %	0.9993	93 %
59	Difenoconazole	12.10	5 %	0.9996	12.81	4 %	0.9999	94 %
60	Difenoxuron	9.22	2 %	0.9999	9.81	3 %	0.9999	94 %
61	Diflubenzuron	11.12	2 %	0.9998	11.85	4 %	0.9998	94 %
62	Dimethoate	5.17	0 %	0.9999	5.90	3 %	1.0000	88 %
63	Dimethoate-D ₆	5.11	3 %	-	5.83	3 %	-	88 %
64	Dimethomorph	10.34	4 %	0.9999	10.97	5 %	0.9999	94 %
65	Dimethylvinphos	10.62	1 %	0.9992	11.46	2 %	0.9999	93 %
66	Diniconazole	12.11	1 %	0.9992	12.95	5 %	0.9999	94 %
67	Diuron	9.12	1 %	0.9997	9.97	2 %	0.9999	91 %
68	DMF	6.87	1 %	1.0000	7.79	1 %	0.9997	88 %
69	DMPF	4.08	5 %	0.9997	4.54	1 %	0.9999	90 %
70	Dodine	11.79	6 %	0.9969	12.48	4 %	0.9965	94 %
71	Edifenphos	11.56	5 %	0.9992	12.28	3 %	0.9990	94 %
72	Emamectin B1a benzoate	12.78	4 %	0.9995	13.33	7 %	0.9992	96 %
73	Emamectin B1b benzoate	12.50	9 %	0.9995	13.06	8 %	0.9993	96 %
74	Epoxiconazole	10.91	5 %	0.9998	11.70	5 %	0.9998	93 %
75	Ethiofencarb	8.36	2 %	0.9991	9.26	5 %	0.9992	90 %
76	Ethion	13.03	7 %	0.9993	13.70	2 %	0.9995	95 %
77	Ethiprole	10.12	7 %	0.9995	10.96	2 %	0.9999	92 %
78	Ethirimol	6.22	1 %	0.9999	7.19	1 %	1.0000	86 %
79	Ethoprophos	10.94	5 %	0.9998	11.80	3 %	0.9998	93 %
80	Etofenprox	14.25	1 %	0.9992	14.88	1 %	0.9988	96 %
81	Etoxazole	13.37	3 %	0.9994	14.00	4 %	0.9991	95 %
82	Famoxadone	11.80	13 %	0.9970	12.44	15 %	0.9978	95 %

83	Fenamidone	10.18	8 %	0.9997	10.95	3 %	0.9999	93 %
84	Fenamiphos	11.24	5 %	0.9990	12.02	4 %	0.9995	94 %
85	Fenamiphos sulfone	8.16	2 %	1.0000	8.91	5 %	0.9997	92 %
86	Fenamiphos sulfoxide	7.92	2 %	0.9998	8.68	5 %	0.9998	91 %
87	Fenarimol	10.89	4 %	0.9986	11.68	4 %	0.9991	93 %
88	Fenazaquin	13.66	10 %	0.9987	14.30	3 %	0.9981	95 %
89	Fenbendazole	10.36	5 %	0.9994	11.07	5 %	0.9996	94 %
90	Fenbuconazole	11.10	6 %	0.9999	11.85	8 %	0.9996	94 %
91	Fenhexamid	10.72	5 %	0.9997	11.59	3 %	0.9993	93 %
92	Fenobucarb	9.87	4 %	0.9999	10.77	3 %	0.9997	92 %
93	Fenoxy carb	11.29	2 %	0.9996	11.97	3 %	0.9997	94 %
94	Fenpropidin	9.52	2 %	1.0000	10.23	2 %	0.9999	93 %
95	Fenpropimorph	9.73	4 %	0.9999	10.52	0 %	0.9997	92 %
96	Fenpyrazamine	10.70	4 %	0.9996	11.44	3 %	0.9999	94 %
97	Fenthion	11.53	7 %	0.9983	12.22	5 %	0.9991	94 %
98	Fenthion sulfone	8.52	11 %	0.9990	9.17	6 %	0.9998	93 %
99	Fenthion sulfoxide	8.21	3 %	0.9999	8.85	2 %	1.0000	93 %
100	Fenuron	4.80	3 %	1.0000	5.50	0 %	0.9998	87 %
101	Fipronil	11.42	1 %	0.9995	12.17	3 %	0.9994	94 %
102	Fipronil sulfone	11.93	5 %	0.9997	12.62	5 %	0.9997	95 %
103	Flazasulfuron	9.60	6 %	0.9993	10.33	2 %	0.9995	93 %
104	Flonicamid	3.64	3 %	0.9991	4.24	4 %	0.9995	86 %
105	Fluacrypyrim	12.31	6 %	0.9997	13.01	4 %	0.9998	95 %
106	Fluazifop	10.06	8 %	0.9977	10.84	6 %	0.9988	93 %
107	Fludioxonil	10.44	8 %	0.9980	11.02	1 %	0.9995	95 %
108	Flufenoxuron	13.35	4 %	0.9999	13.98	5 %	0.9992	96 %
109	Fluometuron	8.53	4 %	0.9999	9.40	2 %	0.9999	91 %
110	Fluopicolide	10.44	7 %	0.9995	11.22	3 %	0.9998	93 %
111	Fluopyram	10.88	4 %	0.9996	11.65	9 %	0.9995	93 %
112	Fluquinconazole	10.64	7 %	0.9997	11.44	6 %	0.9996	93 %
113	Flusilazol	11.27	2 %	0.9997	12.05	2 %	0.9996	94 %
114	Fluxapyrosad	10.46	1 %	0.9999	11.20	2 %	0.9999	93 %
115	Formetanate HCl	2.53	1 %	1.0000	2.73	1 %	0.9998	93 %
116	Fosthiazate	8.53	1 %	1.0000	9.39	0 %	0.9999	91 %
117	Hexaconazole	11.82	1 %	0.9995	12.68	6 %	0.9996	93 %
118	Hexaflumuron	12.43	4 %	0.9995	13.02	5 %	0.9992	95 %
119	Hexythiazox	13.13	3 %	0.9995	13.88	5 %	0.9994	95 %
120	Imazalil	8.60	6 %	0.9997	9.36	1 %	0.9988	92 %
121	Imidacloprid	4.60	1 %	0.9998	5.12	2 %	0.9997	90 %
122	Indoxacarb	12.36	6 %	0.9990	13.03	9 %	0.9988	95 %
123	Ioxynil	9.28	1 %	0.9995	9.97	2 %	1.0000	93 %
124	Iprovalicarb	10.96	7 %	0.9994	11.75	9 %	0.9995	93 %
125	Isofenfos-methyl	11.52	5 %	0.9998	12.28	4 %	0.9996	94 %
126	Isoprocarb	8.88	3 %	0.9999	9.79	3 %	0.9998	91 %

127	Isoprothiolane	10.44	3 %	0.9998	11.13	1 %	1.0000	94 %
128	Isoproturon	8.98	2 %	1.0000	9.86	1 %	0.9999	91 %
129	Isoxaflutole	9.28	5 %	0.9996	10.05	4 %	0.9998	92 %
130	Lenacil	9.01	2 %	0.9998	9.82	3 %	0.9999	92 %
131	Linuron	9.88	5 %	0.9993	10.68	2 %	0.9998	93 %
132	Lufenuron	13.07	9 %	0.9988	13.65	3 %	0.9998	96 %
133	Malathion-D ₁₀	10.44	5 %	0.9996	11.19	2 %	1.0000	93 %
134	Mandipropamid	10.39	7 %	0.9989	11.03	5 %	0.9980	94 %
135	Mepanypirim	10.71	8 %	0.9994	11.25	15 %	0.9941	95 %
136	Metaflumizone	13.00	4 %	0.9998	13.57	1 %	0.9994	96 %
137	Metalaxyl	9.11	3 %	0.9999	9.97	4 %	0.9999	91 %
138	Metamitron	4.78	4 %	0.9997	5.49	9 %	0.9994	87 %
139	Metconazole	11.78	5 %	0.9994	12.62	4 %	0.9996	93 %
140	Methamidophos	1.86	2 %	0.9998	2.22	2 %	0.9997	84 %
141	Methidathion	9.42	3 %	0.9999	10.17	5 %	0.9997	93 %
142	Methiocarb	10.02	1 %	0.9998	10.85	7 %	0.9990	92 %
143	Methiocarb sulfone	5.78	1 %	1.0000	6.21	1 %	0.9987	93 %
144	Methiocarb sulfoxide	5.16	1 %	0.9999	5.54	2 %	1.0000	93 %
145	Methomyl	3.52	2 %	0.9999	3.96	1 %	0.9998	89 %
146	Methoxyfenozide	10.73	7 %	0.9993	11.45	2 %	0.9998	94 %
147	Metobromuron	8.63	5 %	0.9999	9.45	4 %	0.9996	91 %
148	Metolachlor	11.03	1 %	0.9998	11.90	2 %	0.9997	93 %
149	Metolcarb	6.95	3 %	0.9999	7.83	1 %	0.9999	89 %
150	Metrafenone	11.97	2 %	0.9994	12.73	2 %	0.9996	94 %
151	Monocrotophos	4.06	2 %	1.0000	4.55	2 %	0.9999	89 %
152	Monolinuron	8.23	4 %	0.9994	9.05	1 %	1.0000	91 %
153	Monuron	7.19	3 %	0.9998	8.06	2 %	0.9997	89 %
154	Neburon	11.41	15 %	0.9983	12.18	6 %	0.9995	94 %
155	Nitenpyram	3.24	2 %	1.0000	3.67	1 %	1.0000	88 %
156	Novaluron	12.58	8 %	0.9995	13.19	4 %	0.9991	95 %
157	Omethoate	2.63	2 %	1.0000	2.99	2 %	1.0000	88 %
158	Orthosulfamuron	9.18	1 %	0.9996	9.89	3 %	0.9995	93 %
159	Oxadiargyl	11.88	8 %	0.9984	12.65	11 %	0.9993	94 %
160	Oxadixyl	6.99	9 %	0.9993	7.76	10 %	0.9996	90 %
161	Oxamyl	3.29	1 %	1.0000	3.65	1 %	1.0000	90 %
162	Oxasulfuron	7.45	1 %	1.0000	7.99	2 %	0.9997	93 %
163	Oxfendazole	7.30	2 %	0.9999	7.82	2 %	1.0000	93 %
164	Paclobutrazol	10.38	2 %	1.0000	11.21	2 %	0.9998	93 %
165	Paraoxon-methyl	6.82	7 %	0.9997	7.57	2 %	0.9998	90 %
166	Penconazole	11.47	2 %	0.9998	12.33	4 %	0.9997	93 %
167	Pencycuron	12.11	6 %	0.9988	12.86	4 %	0.9990	94 %
168	Pendimethalin	13.11	2 %	0.9990	13.79	3 %	0.9995	95 %

169	Penflufen	11.44	2 %	1.0000	12.26	2 %	0.9999	93 %
170	Penthiopyrad	11.66	5 %	0.9999	12.44	8 %	0.9993	94 %
171	Permethrin	14.21	1 %	0.9989	14.80	4 %	0.9983	96 %
172	Phenthroate	11.46	5 %	0.9997	12.18	2 %	0.9986	94 %
173	Phosalone	11.89	4 %	0.9994	12.63	4 %	0.9991	94 %
174	Phosmet	9.71	4 %	0.9999	10.35	2 %	0.9998	94 %
175	Phoxim	11.96	8 %	0.9985	12.56	5 %	0.9994	95 %
176	Pirimicarb	6.40	0 %	1.0000	7.46	1 %	0.9999	86 %
177	Pirimicarb-desmethyl	4.51	1 %	1.0000	5.09	1 %	0.9999	89 %
178	Pirimiphos-methyl	11.75	7 %	0.9991	12.55	7 %	0.9995	94 %
179	Prochloraz	11.59	4 %	0.9998	12.38	2 %	0.9995	94 %
180	Profenofos	12.57	3 %	0.9998	13.32	7 %	0.9997	94 %
181	Promecarb	10.29	3 %	0.9995	11.13	3 %	0.9995	92 %
182	Prometryn	10.00	6 %	0.9998	10.92	2 %	0.9999	92 %
183	Propamocarb	2.73	1 %	0.9996	3.10	0 %	0.9991	88 %
184	Propaquizafop	12.63	3 %	0.9991	13.35	1 %	0.9993	95 %
185	Propargite	13.31	3 %	0.9995	14.02	2 %	0.9995	95 %
186	Propazine	9.95	2 %	0.9997	10.75	4 %	0.9985	93 %
187	Propiconazole	11.59	8 %	0.9971	12.49	5 %	0.9998	93 %
188	Propoxur	7.57	4 %	0.9996	8.46	2 %	0.9996	90 %
189	Propyzamide	10.33	0 %	0.9999	11.19	3 %	0.9998	92 %
190	Proquinazid	13.36	1 %	0.9990	14.05	5 %	0.9990	95 %
191	Prosulfocarb	12.43	2 %	0.9994	13.21	7 %	0.9994	94 %
192	Pymetrozine	2.43	1 %	0.9999	2.67	0 %	0.9998	91 %
193	Pyraclostrobin	11.80	4 %	0.9995	12.43	4 %	0.9991	95 %
194	Pyridaben	13.74	5 %	0.9984	14.42	2 %	0.9996	95 %
195	Pyridalyl	14.63	8 %	0.9982	15.22	13 %	0.9979	96 %
196	Pyridaphenthion	10.67	3 %	0.9999	11.37	2 %	0.9998	94 %
197	Pyridate	14.05	2 %	0.9998	14.68	4 %	0.9998	96 %
198	Pyrimethanil	9.06	6 %	0.9999	9.96	5 %	0.9998	91 %
199	Pyriofenone	11.93	1 %	0.9996	12.75	2 %	0.9986	94 %
200	Pyriproxyfen	12.85	4 %	0.9997	13.52	4 %	0.9993	95 %
201	Quinalphos	11.37	3 %	0.9986	12.02	4 %	0.9996	95 %
202	Quinoclamine	7.23	3 %	0.9998	7.70	8 %	0.9980	94 %
203	Quinoxifen	12.87	4 %	0.9994	13.60	7 %	0.9994	95 %
204	Quizalofop	10.95	6 %	0.9994	11.72	16 %	0.9981	93 %
205	Quizalofop-ethyl	12.42	5 %	0.9997	13.15	3 %	0.9997	94 %
206	Rotenone	11.12	4 %	0.9998	11.79	9 %	0.9988	94 %
207	Simazine	7.64	12 %	0.9994	8.31	0 %	0.9997	92 %
208	Spinetoram J	12.23	6 %	0.9988	12.94	5 %	0.9996	95 %
209	Spinetoram L	12.61	5 %	0.9997	13.26	6 %	0.9993	95 %
210	Spinosyn A	11.76	2 %	0.9993	12.46	8 %	0.9996	94 %

211	Spinosyn D	12.15	6 %	0.9995	12.82	2 %	0.9997	95 %
212	Spirodiclofen	13.61	6 %	0.9995	14.32	12 %	0.9979	95 %
213	Spiromesifen	13.40	6 %	0.9992	14.11	8 %	0.9995	95 %
214	Spirotetramat	10.88	1 %	0.9998	11.61	4 %	0.9993	94 %
215	Spiroxamine	10.14	1 %	0.9999	10.88	2 %	1.0000	93 %
216	Sulfoxaflor	5.54	3 %	0.9986	6.32	5 %	0.9996	88 %
217	Tebuconazole	11.50	6 %	0.9998	12.34	5 %	0.9998	93 %
218	Tebufenozide	11.50	5 %	0.9996	12.24	8 %	0.9988	94 %
219	Tebufenpyrad	12.70	10 %	0.9992	13.47	4 %	0.9990	94 %
220	Teflubenzuron	12.81	2 %	0.9996	13.48	6 %	0.9992	95 %
221	Terbutylazine	10.20	3 %	0.9994	10.94	3 %	0.9998	93 %
222	Terbutryn	10.13	7 %	0.9997	11.03	5 %	0.9999	92 %
223	Tetraconazole	11.05	7 %	0.9991	11.82	2 %	0.9999	94 %
224	Thiabendazol	4.39	4 %	0.9997	4.64	1 %	0.9998	95 %
225	Thiacloprid	6.03	1 %	0.9999	6.59	0 %	0.9999	92 %
226	Thiamethoxam	3.74	7 %	0.9998	4.22	1 %	0.9985	89 %
227	Thiobencarb	11.93	4 %	0.9993	12.72	5 %	0.9998	94 %
228	Tolclofos-methyl	11.89	7 %	0.9992	12.52	19 %	0.9975	95 %
229	Tolfenpyrad	12.78	2 %	0.9987	13.43	10 %	0.9989	95 %
230	Triadimenol	10.78	13 %	0.9988	11.63	10 %	0.9994	93 %
231	Triallate	13.12	3 %	0.9993	13.70	2 %	0.9999	96 %
232	Triazophos	10.75	2 %	0.9998	11.40	9 %	0.9990	94 %
233	Trichlorfon	4.98	4 %	0.9996	5.83	2 %	0.9999	85 %
234	Triclorcarban	12.30	7 %	0.9996	13.00	1 %	0.9995	95 %
235	Tricyclazole	6.35	1 %	0.9999	6.85	1 %	0.9999	93 %
236	Trifloxystrobin	12.41	3 %	0.9998	13.09	6 %	0.9994	95 %
237	Triflumizole	12.41	3 %	0.9999	13.20	3 %	0.9986	94 %
238	Triflumuron	11.88	3 %	0.9994	12.60	2 %	0.9989	94 %
239	Triticonazole	10.81	3 %	0.9997	11.67	5 %	0.9998	93 %
240	Tritosulfuron	9.80	5 %	0.9995	10.49	10 %	0.9993	93 %
241	Valifenalate	10.90	5 %	0.9991	11.60	7 %	0.9998	94 %
242	XMC	8.15	1 %	0.9999	8.99	4 %	0.9998	91 %
243	Zoxamide	11.65	8 %	0.9993	12.48	7 %	0.9986	93 %

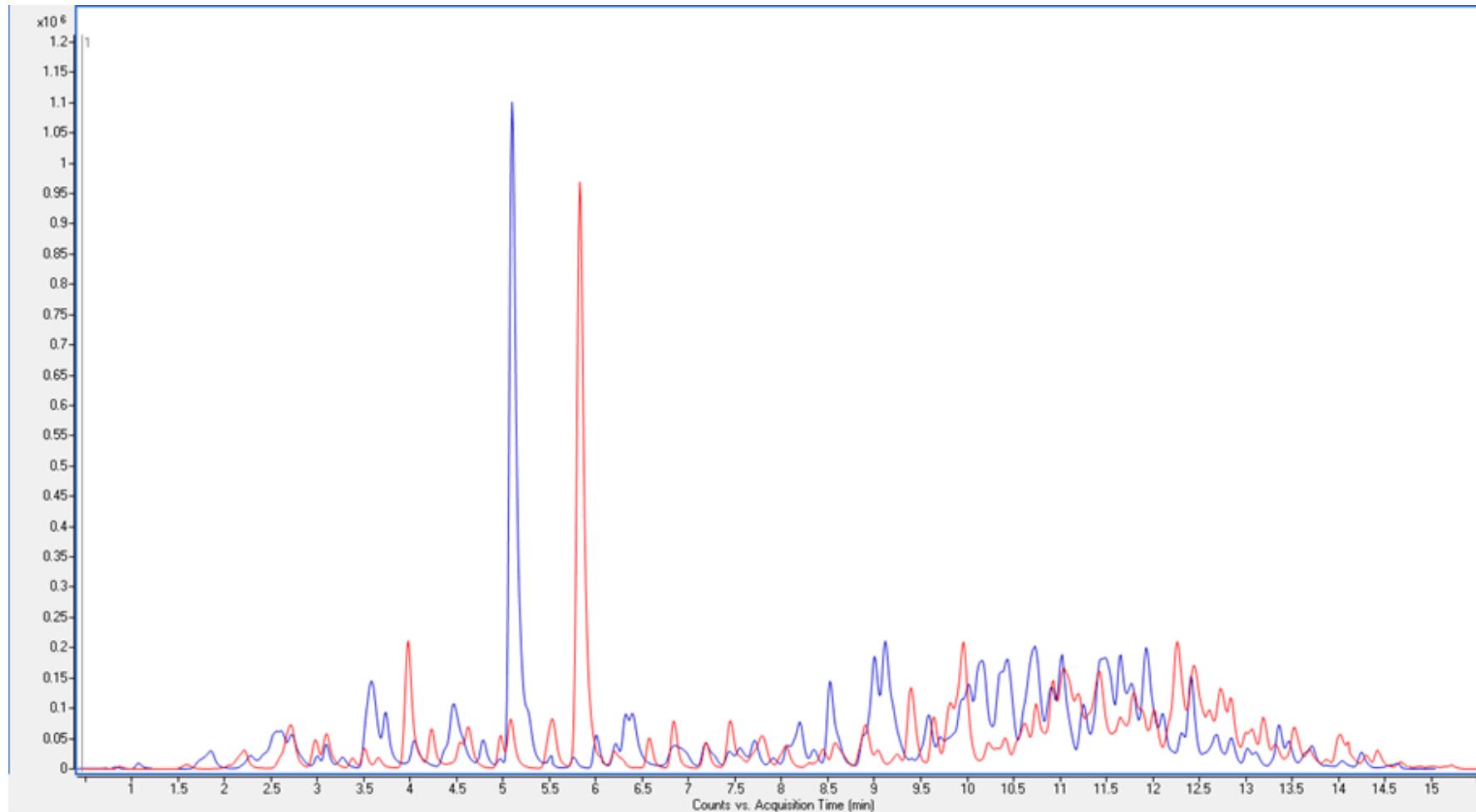
APPENDIX III: TOTAL ION CHROMATOGRAMS

Figure 2. Total ion chromatogram (TIC) of a 20 µg/L standard in tomato extract using column A (blue) and column B (red).