APPENDICES

APPENDIX A

Calibration data of synthetic pyrethroids standard mixture

Calculate:	Internal standard
Based on:	Peak area
Rel.Reference Window:	5.00%
Abs.Reference Window:	0.000 min
Rel.non-ref. Window:	5.00%
Abs.non Window:	0.000 min
Uncalibration peak:	not reported
Partial calibration:	Yes, identified peaks are recalibrated
Correct all ret. Times:	No, only for identified peak
Curve type:	Linear
Origin:	Included
Weight:	Equal
Recalibration setting:	
Average response:	Average all calibrations
Average retention time:	Floating average new 75%

APPENDIX B

Method for preparation of standard solution of synthetic pyrethroids for GC-ECD

Step of synthetic pyrethroid standard preparation were as follows:

(1) Step 1: Critical weight of individual synthetic pyrethroid in isooctane (Table B.1)

(2) Step 2: Preparation of intermediate standard mixture (IM) (Table B.2)

(3) Step 3: Preparation of intermediate mixture at individual level in 10 ml ethyl acetate (IM_1-IM_8) (Table B.3)

(4) Step 4: Preparation of working standard mixture in 10 ml isooctane (M_1-M_8) (Table B.2)

Table B.1 Critical weight of individual synthetic pyrethroid in isooctane

No	synthetic pyrethroid	Critical weight, g in 10 ml isooctane	Stock standard Concentration, mg/ml
1	Bifenthrin (IS)	0.0498	4.98
2	Cyfluthrin	0.2363	23.63
3	Cypermethrin	0.0910	9.10
4	Deltamethrin	0.1973	19.73
5	Fenvalerate	0.2488	24.88
6	Lambda cyhalothrin	0.0985	9.85
7	Permethrin	0.2363	23.63

Note: IS = internal standard

Table B.2 Critical weight of individual synthetic pyrethroid in isooctane

No	synthetic pyrethroid	Stock standard concentration mg/ml	Intermediate Concentration µg/ml	Preparation in 10 ml EA Pipet stock standard in µl
1	Bifenthrin (IS)	4.98	50	100.5
2	Cyfluthrin	23.63	50	21.16
3	Cypermethrin	9.10	50	54.94
4	Deltamethrin	19.73	50	25.34
5	Fenvalerate	24.88	50	20.10
6	Lambda cyhalothrin	9.85	50	50.76
7	Permethrin	23.63	50	21.16

APPENDIX C

Table C1 Results of synthetic pyrethroid insecticide residues in vegetable and fruit June 2009

Commodity	Lambda cyhalothrin	Permethrin	Cyfluthrin	Cypermethrin	Fenvalerate	Deltamethrin
cabbage	ND	ND	0.151	0.132	0.019	0.101
	ND	0.002	0.091	0.039	0.011	0.163
	<LOQ	ND	0.087	0.038	0.026	0.584
	ND	0.053	0.053	ND	0.031	0.574
	ND	ND	0.088	0.023	0.032	0.26
kale	ND	ND	<LOQ	0.186	<LOQ	0.324
	0.044	ND	0.049	0.061	<LOQ	0.299
	ND	0.01	0.139	0.071	0.098	0.511
	ND	ND	0.06	0.676	0.046	0.469
	ND	0.05	0.07	ND	0.024	0.324
	ND	0.036	0.05	1.477	<LOQ	0.506
	ND	0.01	0.063	0.07	0.053	0.966
	ND	0.04	0.098	3.856	0.043	0.047
string bean	ND	0.129	0.075	0.204	0.045	0.052
	ND	ND	0.089	2.32	<LOQ	ND
	ND	ND	0.11	0.105	0.009	ND
	ND	ND	0.099	0.876	<LOQ	ND
	ND	ND	0.05	0.014	0.026	ND
	ND	0.072	0.049	0.47	<LOQ	ND

Commodity	Lambda cyhalothrin	Permethrin	Cyfluthrin	Cypermethrin	Fenvalerate	Deltamethrin
sweet pea	ND	0.076	0.049	1.984	0.021	0.016
	ND	0.108	0.064	0.206	0.024	0.135
cucumber	ND	ND	0.038	0.062	0.019	0.011
	ND	ND	<LOQ	ND	<LOQ	ND
	ND	ND	<LOQ	ND	<LOQ	ND
	ND	ND	<LOQ	ND	<LOQ	ND
	ND	ND	<LOQ	ND	<LOQ	ND
	ND	ND	<LOQ	ND	<LOQ	<LOQ
	ND	ND	<LOQ	ND	<LOQ	ND
	ND	ND	<LOQ	ND	<LOQ	ND
	ND	ND	<LOQ	ND	<LOQ	ND
	ND	ND	0.066	0.052	<LOQ	ND
chinese cabbage	ND	0.014	0.108	0.022	0.018	<LOQ
	ND	ND	0.106	5.607	<LOQ	ND
	ND	ND	0.123	3.994	0.018	0.074
	ND	ND	0.099	0.135	0.01	0.016
apple	ND	0.015	0.063	0.126	>LOQ	ND
	ND	0.03	0.029	0.027	0.014	ND
grape	ND	0.054	0.184	0.027	0.02	ND
	ND	ND	>LOQ	0.78	0.005	ND
	ND	ND	>LOQ	0.038	0.533	ND

Commodity	Lambda cyhalothrin	Permethrin	Cyfluthrin	Cypermethrin	Fenvalerate	Deltamethrin
tangerine	ND	ND	0.033	0.017	>LOQ	ND
	0.093	0.15	0.068	1.328	>LOQ	0.735
	ND	0.062	0.016	ND	>LOQ	0.991
	0.115	0.042	0.056	0.951	>LOQ	0.358
dragon fruit	ND	ND	0.072	0.153	0.031	0.724
	0.083	ND	0.066	0.776	>LOQ	0.976
	ND	0.029	0.095	0.214	0.027	0.06
	ND	0.01	0.08	0.161	0.014	0.065
	ND	0.038	0.102	0.205	0.018	0.072
	0.054	0.032	0.158	0.207	0.023	0.087
lychee	ND	0.01	0.145	0.036	0.02	ND
	ND	0.069	0.202	1.761	0.084	0.088
	ND	0.031	0.15	1.808	0.076	0.12
	0.218	0.026	0.164	0.151	0.055	0.068
	ND	0.195	0.23	11.833	0.113	0.066
	ND	0.043	0.076	0.636	0.045	0.027
Min	0.044	0.002	0.016	0.014	0.005	0.011
Max	0.22	0.20	0.23	11.83	0.53	0.99
No	6	28	45	45	34	33
% detection	10.7	50.0	80.4	80.4	60.7	58.9

Table C2 Results of synthetic pyrethroid insecticide residues in vegetable and fruit March 2010

Commodity	lambda cyhalothrin	permethrin	cyfluthrin	cypermethrin	fenvalerate	deltamethrin
cabbage	0.234	0.055	0.137	0.106	0.204	0.795
	0.106	0.063	0.061	0.131	2.347	0.458
	0.878	ND	0.130	0.092	0.325	1.151
	0.181	ND	ND	ND	0.216	4.854
	0.502	ND	ND	0.067	0.301	0.494
Kale	ND	ND	0.196	0.326	0.028	0.319
	0.153	0.015	0.014	0.044	ND	1.092
	0.426	ND	ND	ND	ND	9.972
	ND	ND	ND	ND	ND	ND
Water spinach	ND	0.041	0.055	0.276	0.906	0.424
	0.695	ND	0.333	0.073	0.167	ND
	0.185	0.261	0.199	0.181	ND	ND
Cauliflower	0.757	0.074	0.171	0.053	0.867	0.456
	0.366	ND	0.028	0.031	ND	0.776
	0.263	0.080	0.175	0.131	ND	ND
Chinese cabbage	0.221	0.160	0.544	0.196	0.191	0.298
	ND	ND	ND	ND	0.499	ND
	0.285	0.035	0.077	0.054	ND	0.798

Commodity	lambda cyhalothrin	permethrin	cyfluthrin	cypermethrin	fenvalerate	deltamethrin
Chinese mustard	1.072	ND	ND	1.415	ND	ND
	0.533	0.092	0.075	0.069	0.190	0.445
	ND	0.019	0.060	0.099	0.202	0.404
	0.429	0.007	ND	0.063	0.173	4.753
Yard long bean	0.501	0.012	0.086	0.055	0.229	0.502
	ND	0.062	0.127	0.078	ND	ND
	0.221	0.047	0.226	0.088	0.101	0.478
	0.325	0.021	0.096	0.089	0.113	ND
Cucumber	0.193	0.073	0.099	0.061	0.083	0.436
	0.121	0.044	ND	0.009	0.600	0.592
	ND	0.027	0.187	0.034	ND	0.419
	0.129	ND	ND	ND	ND	0.483
Tangerine	0.537	0.292	ND	ND	ND	ND
	0.342	ND	ND	1.954	ND	0.317
	0.269	ND	ND	1.759	ND	0.788
	ND	0.070	ND	1.659	ND	0.228
Apple	0.246	ND	0.272	5.398	0.139	ND
	ND	0.718	ND	0.051	0.144	ND
	ND	0.785	0.056	0.010	0.020	0.382
	ND	0.038	0.050	0.038	ND	ND
	0.386	0.002	0.060	0.185	0.106	ND

Commodity	lambda cyhalothrin	permethrin	cyfluthrin	cypermethrin	fenvalerate	deltamethrin
	0.183	0.146	0.315	0.201	0.027	0.292
Guava	0.133	0.424	0.177	0.069	0.093	0.540
	0.047	0.095	0.427	0.032	0.062	ND
	0.079	0.022	0.013	0.151	0.578	ND
Sand pear	0.072	ND	0.182	ND	0.117	ND
	0.277	0.018	0.024	0.039	0.097	0.188
	ND	0.020	0.056	0.024	0.163	0.382
	0.031	0.139	ND	0.155	1.024	ND
Mango	ND	ND	0.700	0.094	0.640	ND
	0.030	0.017	0.013	0.009	0.048	ND
	0.186	ND	0.029	0.029	0.167	0.153
	0.091	0.200	ND	0.260	2.256	ND
Rose apple	ND	ND	ND	1.595	3.744	2.739
	0.176	0.024	0.030	0.051	0.142	0.046
Min	0.030	0.002	0.013	0.009	0.020	0.046
Max	1.07	0.78	0.70	5.40	3.74	9.97
No	39	35	36	46	37	33
% detection	73.6	66.0	67.9	86.8	69.8	62.3

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Research Publications

Oral Presentations

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