



FRSP 2011-2012

Quarterly Report

Quarter Four

Prepared by Chemical & Microbiological Assurance Team

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Summary

The Food Residue Surveillance Programme (FRSP) is an annual surveillance programme that has been run by Ministry for Primary Industries (MPI), formerly MAF and NZFSA, since 2003. The programme assesses the effectiveness of current controls of chemical residues on imported and locally-produced foods.

During quarter four lemon, spring onion, feijoa, sweet corn and olive oil were tested.

One sample of lemon had non-compliant residue results for the MRL for pyrimethanil. Residue levels found in six samples of olive oil, taking into account processing factors and measurement uncertainty, indicate that it is likely the raw olives would have breached the NZ MRL for either azoxystrobin or propiconazole. While none of these non-compliances pose a risk to human health, the non-compliant residues could suggest that good agricultural practice (GAP) has not been complied with.

One sample of organic olive oil was found to contain a residue of chlorpyrifos. While the residue was within the MRL and does not represent a food safety issue, this compound should not be present in organic olive oil.

MPI will be following up on both these issues.

Introduction

The Food Residue Surveillance Programme (FRSP) is an annual surveillance programme that has been run by MPI, formerly MAF and NZFSA, since 2003. The programme assesses the effectiveness of current controls of chemical residues on imported and locally-produced foods.

Results are reported after each quarter of testing. Previously results were released in a spreadsheet format. This year MPI is releasing the results in report format. These quarterly reports will not provide an extensive analysis of results. A more comprehensive report analysing the results will be released at the end of the annual testing period (last quarter of 2012).

FRSP 2011 tested twelve food commodities during May 2011 through to April 2012. The products tested in quarter four include lemon, spring onion, feijoa, sweet corn and olive oil.

This report details the results received for quarter four, encompassing samples taken during February, March and April 2012.

Products tested during quarter four

SAMPLING

MPI are responsible for collecting samples.

METHODOLOGY

Two techniques are being used to analyse the samples for pesticides, they are:

- Gas chromatography –mass spectrometry (GC-MSMS/MS)
- Liquid chromatography –mass spectrometry (LC-MS/MS)

Dithiocarbamates are also being tested for (as carbon disulphide) using GC-MSMS/MS.

A total of 265 pesticides are being tested using GC-MSMS/MS for fruit and vegetables and 255 pesticides are being tested for in vegetable oils. 352 pesticides (some of these are also in the GC-MSMS suite) are being tested for using LC-MS/MS for fruit, vegetables and oils. Some pesticides are duplicated in the GC-MSMS/MS and LC-MS/MS suites.

A list of all pesticides being tested for can be found in Appendix 1.

Results

Lemon, spring onion, feijoa, sweet corn and olive oil samples were tested in quarter four. Lemons were over sampled by two samples. Feijoas were not in the sampling plan for quarter four, but were sampled due to the lack of availability of fejoas in quarter one.

Table 1 shows a summary of the samples collected in quarter four and the results for lemon, spring onion, feijoa, sweet corn and olive oil.

Table 1: Quarter 4 Samples Taken

Product	Total Samples Collected	Total Samples specified during reporting period	Total Number of residue detections
Lemon (Imported/Domestic)	26	24	95
Spring onion (Domestic)	24	24	69
Feijoa (Domestic)	11	0	4
Sweet Corn (Domestic)	48	48	1
Olive Oil (Imported/Domestic)	24	24	41
Table Totals	133	120	210

DETECTIONS (PESTICIDES)

Table 2: Detections in Lemons

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
423	0.19	7 mg/kg	Dithiocarbamates	GC-MSMS
425	0.019	0.1 mg/kg (NZ default MRL)	Simazine	GC-MSMS
425	0.014	0.1 mg/kg (NZ default MRL)	Diuron	LC-MSMS
425	1.4	5 mg/kg	Imazalil	LC-MSMS
425	0.024	0.1 mg/kg (NZ default MRL)	Simazine	LC-MSMS
425	1.3	3 mg/kg	Thiabendazole	LC-MSMS
427	1	5 mg/kg	Imazalil	LC-MSMS
427	0.4	3 mg/kg	Thiabendazole	LC-MSMS
429	0.68	10 mg/kg (Codex)	Fludioxonil	GC-MSMS
429	0.91	10 mg/kg (Codex)	Fludioxonil	LC-MSMS
429	1.2	5 mg/kg	Imazalil	LC-MSMS
429	0.011	0.02 mg/kg	Imidacloprid	LC-MSMS
429	0.61	3 mg/kg	Thiabendazole	LC-MSMS
430	0.16	7 mg/kg	Dithiocarbamates	GC-MSMS
432	0.15	7 mg/kg	Dithiocarbamates	GC-MSMS
432	0.028	8 mg/kg	Malathion	GC-MSMS
432	0.04	8 mg/kg	Malathion	LC-MSMS
434	0.31	10 mg/kg (Codex)	Fludioxonil	GC-MSMS
434	0.016	0.5 mg/kg (codex)	Pyriproxyfen	GC-MSMS
434	0.39	10 mg/kg (Codex)	Fludioxonil	LC-MSMS
434	1.1	5 mg/kg	Imazalil	LC-MSMS
434	0.018	0.5 mg/kg (codex)	Pyriproxyfen	LC-MSMS
434	0.41	3 mg/kg	Thiabendazole	LC-MSMS
435	0.15	7 mg/kg	Dithiocarbamates	GC-MSMS
437	0.15	10 mg/kg (Codex)	Fludioxonil	GC-MSMS
437	0.21	10 mg/kg (Codex)	Fludioxonil	LC-MSMS
437	1.7	5 mg/kg	Imazalil	LC-MSMS
437	0.63	3 mg/kg	Thiabendazole	LC-MSMS
439	0.023	8 mg/kg	Malathion	GC-MSMS
439	0.024	8 mg/kg	Malathion	LC-MSMS
441	0.058	0.2 mg/kg	Chlorpyrifos	GC-MSMS
441	0.082	0.2 mg/kg	Chlorpyrifos	LC-MSMS
441	0.014	10 mg/kg (Codex)	Fludioxonil	LC-MSMS
441	1.2	5 mg/kg	Imazalil	LC-MSMS
441	0.25	3 mg/kg	Thiabendazole	LC-MSMS
442	0.72	10 mg/kg (Codex)	Fludioxonil	GC-MSMS
442	0.88	10 mg/kg (Codex)	Fludioxonil	LC-MSMS
442	1.8	5 mg/kg	Imazalil	LC-MSMS
442	0.014	0.02 mg/kg	Imidacloprid	LC-MSMS
442	1	3 mg/kg	Thiabendazole	LC-MSMS
445	0.045	8 mg/kg	Malathion	GC-MSMS
445	0.056	8 mg/kg	Malathion	LC-MSMS
448	0.19	7 mg/kg	Dithiocarbamates	GC-MSMS
448	0.07	8 mg/kg	Malathion	GC-MSMS
448	0.17	0.1 mg/kg (NZ default MRL)	Pyrimethanil	GC-MSMS
448	0.17	5 mg/kg	Acephate	LC-MSMS
448	0.71	5 mg/kg	Carbendazim	LC-MSMS
448	0.072	8 mg/kg	Malathion	LC-MSMS
448	0.018	0.5 mg/kg	Methamidophos	LC-MSMS
448	0.14	0.1 mg/kg (NZ default MRL)	Pyrimethanil	LC-MSMS
451	0.11	8 mg/kg	Malathion	GC-MSMS

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
451	0.065	8 mg/kg	Malathion	LC-MSMS
458	0.38	5 mg/kg	Imazalil	LC-MSMS
458	0.13	3 mg/kg	Thiabendazole	LC-MSMS
461	0.1	0.5 mg/kg	Diazinon	GC-MSMS
461	0.27	5 mg/kg	Acephate	LC-MSMS
461	0.063	0.5 mg/kg	Diazinon	LC-MSMS
461	0.029	0.5 mg/kg	Methamidophos	LC-MSMS
462	0.58	10 mg/kg (Codex)	Fludioxonil	GC-MSMS
462	0.71	10 mg/kg (Codex)	Fludioxonil	LC-MSMS
462	0.46	5 mg/kg	Imazalil	LC-MSMS
462	0.49	3 mg/kg	Thiabendazole	LC-MSMS
463	0.059	0.2 mg/kg	Chlorpyrifos	GC-MSMS
463	0.077	0.2 mg/kg	Chlorpyrifos	LC-MSMS
463	0.85	5 mg/kg	Imazalil	LC-MSMS
463	0.58	3 mg/kg	Thiabendazole	LC-MSMS
464	0.047	8 mg/kg	Malathion	GC-MSMS
464	0.08	8 mg/kg	Piperonyl butoxide	GC-MSMS
464	0.12	5 mg/kg	Acephate	LC-MSMS
464	0.03	8 mg/kg	Malathion	LC-MSMS
464	0.014	0.5 mg/kg	Methamidophos	LC-MSMS
464	0.13	8 mg/kg	Piperonyl butoxide	LC-MSMS
466	0.29	7 mg/kg	Dithiocarbamates	GC-MSMS
466	0.053	5 mg/kg	Acephate	LC-MSMS
467	0.029	0.5 mg/kg	Diazinon	GC-MSMS
467	0.54	5 mg/kg	Acephate	LC-MSMS
467	0.015	0.5 mg/kg	Diazinon	LC-MSMS
467	0.061	0.5 mg/kg	Methamidophos	LC-MSMS
467	0.021	8 mg/kg	Piperonyl butoxide	LC-MSMS
531	0.037	7 mg/kg	Dithiocarbamates	GC-MSMS
531	0.028	8 mg/kg	Malathion	GC-MSMS
531	0.044	0.1 mg/kg (NZ default MRL)	Pyrimethanil	GC-MSMS
531	0.25	5 mg/kg	Acephate	LC-MSMS
531	0.024	0.1 mg/kg (NZ default MRL)	Azoxystrobin	LC-MSMS
531	0.46	5 mg/kg	Carbendazim	LC-MSMS
531	0.033	8 mg/kg	Malathion	LC-MSMS
531	0.027	0.5 mg/kg	Methamidophos	LC-MSMS
531	0.033	0.1 mg/kg (NZ default MRL)	Pyrimethanil	LC-MSMS
532	0.67	5 mg/kg	Imazalil	LC-MSMS
532	0.018	8 mg/kg	Piperonyl butoxide	LC-MSMS
538	0.27	7 mg/kg	Dithiocarbamates	GC-MSMS
538	0.022	0.5 mg/kg	Diazinon	GC-MSMS
538	0.032	8 mg/kg	Malathion	GC-MSMS
538	0.026	0.5 mg/kg	Diazinon	LC-MSMS
538	0.046	8 mg/kg	Malathion	LC-MSMS

1 non compliant sample identified in lemons (highlighted in table). (FRSP448)

Note: (Codex) means that the compound is not registered in NZ & therefore if the sample is imported a Codex MRL, if set, is applicable, otherwise the NZ default MRL applies.

Table 3: Detections in Spring Onion

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
470	0.15	7 mg/kg	Dithiocarbamates	GC-MSMS
470	0.025	0.05 mg/kg	Methabenzthiazuron	LC-MSMS

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
470	0.037	2 mg/kg	Omethoate	LC-MSMS
471	0.086	7 mg/kg	Dithiocarbamates	GC-MSMS
471	0.01	0.05 mg/kg	Methabenzthiazuron	LC-MSMS
471	0.018	0.2 mg/kg	Triadimenol	LC-MSMS
477	0.38	7 mg/kg	Dithiocarbamates	GC-MSMS
477	0.01	0.1 mg/kg (NZ default MRL)	Chlorpyrifos	GC-MSMS
477	0.069	0.1 mg/kg (NZ default MRL)	Dimethomorph	GC-MSMS
477	0.07	0.2 mg/kg	Triadimenol	GC-MSMS
477	0.092	0.2 mg/kg	Triadimenol	LC-MSMS
478	0.082	7 mg/kg	Dithiocarbamates	GC-MSMS
478	0.01	0.05 mg/kg	Methabenzthiazuron	LC-MSMS
480	0.17	7 mg/kg	Dithiocarbamates	GC-MSMS
482	0.42	7 mg/kg	Dithiocarbamates	GC-MSMS
482	0.014	0.1 mg/kg (NZ default MRL)	Dimethomorph	GC-MSMS
482	0.051	0.2 mg/kg	Triadimenol	GC-MSMS
482	0.033	0.1 mg/kg (NZ default MRL)	Carbendazim	LC-MSMS
482	0.021	0.1 mg/kg (NZ default MRL)	Dimethomorph	LC-MSMS
482	0.011	0.2 mg/kg	Mandipropamid	LC-MSMS
482	0.013	2 mg/kg	Methamidophos	LC-MSMS
482	0.039	0.2 mg/kg	Triadimenol	LC-MSMS
484	0.21	7 mg/kg	Dithiocarbamates	GC-MSMS
495	0.02	7 mg/kg	Dithiocarbamates	GC-MSMS
495	0.011	0.05 mg/kg	Methabenzthiazuron	LC-MSMS
496	0.12	7 mg/kg	Dithiocarbamates	GC-MSMS
500	0.094	7 mg/kg	Dithiocarbamates	GC-MSMS
503	1.2	7 mg/kg	Dithiocarbamates	GC-MSMS
503	0.047	0.1 mg/kg (NZ default MRL)	Chlorpyrifos	GC-MSMS
503	0.053	0.1 mg/kg (NZ default MRL)	Dimethomorph	GC-MSMS
503	0.033	0.1 mg/kg (NZ default MRL)	Chlorpyrifos	LC-MSMS
503	0.04	0.1 mg/kg (NZ default MRL)	Dimethomorph	LC-MSMS
507	0.16	7 mg/kg	Dithiocarbamates	GC-MSMS
508	0.41	7 mg/kg	Dithiocarbamates	GC-MSMS
508	0.045	0.1 mg/kg (NZ default MRL)	Chlorpyrifos	GC-MSMS
508	0.015	0.1 mg/kg (NZ default MRL)	Dimethomorph	GC-MSMS
508	0.054	0.1 mg/kg (NZ default MRL)	Chlorpyrifos	LC-MSMS
508	0.017	0.1 mg/kg (NZ default MRL)	Dimethomorph	LC-MSMS
514	0.042	7 mg/kg	Dithiocarbamates	GC-MSMS
515	0.31	7 mg/kg	Dithiocarbamates	GC-MSMS
515	0.012	2 mg/kg	Chlorthal-dimethyl	GC-MSMS
515	0.012	0.1 mg/kg (NZ default MRL)	Dimethomorph	LC-MSMS
515	0.011	0.05 mg/kg	Methabenzthiazuron	LC-MSMS
517	0.17	7 mg/kg	Dithiocarbamates	GC-MSMS
519	0.12	7 mg/kg	Dithiocarbamates	GC-MSMS
525	0.19	7 mg/kg	Dithiocarbamates	GC-MSMS
525	0.041	0.2 mg/kg	Triadimenol	GC-MSMS
525	0.035	0.2 mg/kg	Triadimenol	LC-MSMS
539	0.4	7 mg/kg	Dithiocarbamates	GC-MSMS
539	0.01	2 mg/kg	Chlorthal-dimethyl	GC-MSMS
539	0.011	0.1 mg/kg (NZ default MRL)	Dimethomorph	LC-MSMS
539	0.013	0.05 mg/kg	Methabenzthiazuron	LC-MSMS
540	0.032	7 mg/kg	Dithiocarbamates	GC-MSMS
541	0.17	7 mg/kg	Dithiocarbamates	GC-MSMS
543	0.5	7 mg/kg	Dithiocarbamates	GC-MSMS
543	0.017	0.1 mg/kg (NZ default MRL)	Chlorpyrifos	GC-MSMS
543	0.021	0.1 mg/kg (NZ default MRL)	Cyanazine	GC-MSMS

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
543	0.017	0.1 mg/kg (NZ default MRL)	Dimethomorph	GC-MSMS
543	0.038	0.2 mg/kg	Triadimenol	GC-MSMS
543	0.04	0.1 mg/kg (NZ default MRL)	Chlorpyrifos	LC-MSMS
543	0.02	0.1 mg/kg (NZ default MRL)	Cyanazine	LC-MSMS
543	0.031	0.1 mg/kg (NZ default MRL)	Dimethomorph	LC-MSMS
543	0.029	0.2 mg/kg	Triadimenol	LC-MSMS
544	0.23	7 mg/kg	Dithiocarbamates	GC-MSMS
554	0.51	7 mg/kg	Dithiocarbamates	GC-MSMS
554	0.011	0.1 mg/kg (NZ default MRL)	Dimethomorph	GC-MSMS
554	0.036	0.2 mg/kg	Triadimenol	GC-MSMS
554	0.018	0.1 mg/kg (NZ default MRL)	Dimethomorph	LC-MSMS
554	0.046	0.2 mg/kg	Triadimenol	LC-MSMS

Table 4: Detections in Feijoas

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
545	0.047	3 mg/kg	Carbaryl	GC-MSMS
545	0.046	3 mg/kg	Carbaryl	LC-MSMS
550	0.15	8 mg/kg	Piperonyl butoxide	GC-MSMS
550	0.22	8 mg/kg	Piperonyl butoxide	LC-MSMS

Table 5: Detections in Sweet corn

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
479	0.025	7 mg/kg (NZ)	Dithiocarbamates	GC-MSMS

Table 5: Detections in Olive Oil

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)**	Pesticide	Methodology
469	0.013	0.1 mg/kg	Terbutylazine	LC-MSMS
474	0.13	0.4 mg/kg	Azoxystrobin	LC-MSMS
475	0.033	0.24 mg/kg	Metidathion	LC-MSMS
486	0.022	0.04 mg/kg	Chlorpyrifos	LC-MSMS
486	0.017	0.04 mg/kg	Chlorpyrifos	GC-MSMS
486	0.039	0.1 mg/kg	Oxyfluorfen	GC-MSMS
487	0.59	0.4 mg/kg	Azoxystrobin	LC-MSMS
487	0.47*	0.4 mg/kg	Azoxystrobin	GC-MSMS
488	0.024	0.04 mg/kg	Chlorpyrifos	LC-MSMS
488	0.031	0.04 mg/kg	Chlorpyrifos	GC-MSMS
490	0.014	0.04 mg/kg	Chlorpyrifos	LC-MSMS
491	0.01	0.1 mg/kg	Terbutylazine	LC-MSMS
493	0.033	0.01 mg/kg	Propiconazole	LC-MSMS
493	0.028	0.01 mg/kg	Propiconazole	GC-MSMS
497	0.029	0.04 mg/kg	Chlorpyrifos	LC-MSMS
497	0.016	0.04 mg/kg	Chlorpyrifos	GC-MSMS
497	0.016	0.1 mg/kg	Oxyfluorfen	GC-MSMS
504	0.61	0.4 mg/kg	Azoxystrobin	LC-MSMS
504	0.42*	0.4 mg/kg	Azoxystrobin	GC-MSMS
505	0.038	0.04 mg/kg	Chlorpyrifos	LC-MSMS
505	0.025	0.04 mg/kg	Chlorpyrifos	GC-MSMS
505	0.016	0.1 mg/kg	Oxyfluorfen	GC-MSMS

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)**	Pesticide	Methodology
510	0.011	0.1 mg/kg	Buprofezin	LC-MSMS
510	0.044*	0.04 mg/kg	Chlorpyrifos	LC-MSMS
510	0.013	0.1 mg/kg	Terbutylazine	LC-MSMS
510	0.04*	0.04 mg/kg	Chlorpyrifos	GC-MSMS
510	0.1	0.1 mg/kg	Oxyfluorfen	GC-MSMS
511	0.013	0.1 mg/kg	Terbutylazine	LC-MSMS
511	0.045	0.1 mg/kg	Oxyfluorfen	GC-MSMS
513	0.034	0.01 mg/kg	Propiconazole	LC-MSMS
513	0.026	0.01 mg/kg	Propiconazole	GC-MSMS
521	0.017	0.04 mg/kg	Chlorpyrifos	LC-MSMS
521	0.015	0.04 mg/kg	Chlorpyrifos	GC-MSMS
521	0.036	0.1 mg/kg	Oxyfluorfen	GC-MSMS
522	0.73	0.4 mg/kg	Azoxystrobin	LC-MSMS
522	0.47*	0.4 mg/kg	Azoxystrobin	GC-MSMS
523	0.68	0.4 mg/kg	Azoxystrobin	LC-MSMS
523	0.39	0.4 mg/kg	Azoxystrobin	GC-MSMS
524	0.017	0.04 mg/kg	Chlorpyrifos	LC-MSMS
524	0.01	0.04 mg/kg	Chlorpyrifos	GC-MSMS
524	0.012	0.1 mg/kg	Oxyfluorfen	GC-MSMS

** This is equal to the NZ MRL multiplied by the processing factor.

* Non compliances with the MRL are taken to exist when the reported value taken together with the measurement uncertainty exceeds the MRL

Residue levels found in 6 samples of olive oil (highlighted in table), taking into account processing factors and measurement uncertainty, indicate that it is likely the raw olive would have breached the NZ MRL. (FRSP487, FRSP493, FRSP504, FRSP513, FRSP522, FRSP523).

Note: Sample FRSP490 was collected as an organic sample of olive oil. For FRSP490 Chlorpyrifos was also detected in GC-MSMS method but was not reported as it fell below the reporting limit of 0.01mg/kg. However its presence has been confirmed.

Conclusion

Residues were found in all of the product categories tested. However, no non-compliances were found in the spring onion, feijoa and sweetcorn.

One sample of lemon had non-compliant residue results for the MRL for pyrimethanil. Residue levels found in six samples of olive oil, taking into account processing factors and measurement uncertainty, indicate that it is likely the raw olives would have breached the NZ MRL for either azoxystrobin or propiconazole. While none of these non-compliances pose a risk to human health, the non-compliant residues could suggest that good agricultural practice (GAP) has not been complied with.

One sample of organic olive oil was found to contain a residue of chlorpyrifos. While the residue was within the MRL and does not represent a food safety issue, this compound should not be present in organic olive oil.

MPI will be following up on both these issues.

Appendix 1: Pesticides tested in FRSP 2011

Pesticides by GC-MSMS	Fruit and Vegetables*		
Units	mg/kg		
Compound	Compound	Compound	Compound
Acetochlor	DDT (p,p')	Flumiclorac pentyl	Pirimicarb
Alachlor	Deltamethrin	Flumioxazin	Pirimiphos-methyl
Aldrin	Demeton-s-methyl	Fluquinconazole	Pretilachlor
Allidochlor	Diazinon	Flusilazole	Prochloraz
Ametryn	Dichlobenil	Flutolanil	Procymidone
Anilofos	Dichlofenthion	Flutriafol	Profenofos
Atrazine	Dichlofluanid	Fluvalinate	Promecarb
Azaconazole	Dichloran	Fonofos	Prometryn
Azinphos-methyl	Dicofol	Fosthiazate	Propachlor
Azoxystrobin	Dichlorvos	Furalaxyl	Propargite
Benalaxyl	Diclobutrazol	Furathiocarb	Propazine
Bendiocarb	Diclofop-methyl	Haloxypop-etotyl	Propetamphos
Benfluralin	Dicrotophos	Haloxypop-methyl	Propham
Benodanil	Dieldrin	Heptachlor	Propiconazole
Benoxacor	Diethofencarb	Heptachlor epoxide	Propoxur
BHC (alpha)	Difenoconazole	Heptenophos	Propyzamide
BHC (beta)	Diflufenican	Hexachlorobenzene	Prothiofos
BHC (delta)	Dimepiperate	Hexaconazole	Pyraclostrobin
Bifenox	Dimethenamid	Hexazinone	Pyraflufen ethyl
Bifenthrin	Dimethoate	Indoxacarb	Pyrazophos
Bioresmethrin	Dimethomorph	Iodofenphos	Pyributicarb
Bitertanol	Dimethylvinphos	Iprobenfos	Pyridaben
Bromacil	Dioxabenzofos	Iprodione	Pyridafenthion
Bromobutide	Diphenamid	Iprovalicarb	Pyrimethanil
Bromophos-ethyl	Diphenylamine	Isazophos	Pyrimidifen
Bromophos	Disulfoton	Isofenphos	Pyriminobac-methyl(E)
Bromopropylate	Dithiopyr	Isoprocarb	Pyriminobac-methyl(Z)
Bupirimate	Edifenphos	Isoprothiolane	Pyriproxyfen
Buprofezin	Endosulfan sulphate	Kresoxim-methyl	Quinalphos
Butachlor	Endosulfan (alpha)	Lactofen	Quinoclamine
Butafenacil	Endosulfan (beta)	Leptophos	Quinoxyfen
Butamifos	Endrin	Lindane	Quintozone
Cadusafos	EPN	Linuron	Quizalofop-ethyl
Captan [#]	Epoxiconazole	Malathion	Simazine
Carbaryl	EPTC	Mepronil	Simeconazole

Pesticides by GC-MSMS	Fruit and Vegetables*		
Carbofuran	Esfenvalerate	Metalaxyl	Simetryn
Carboxin	Esprocarb	Methacrifos	Sulfentrazone
Carfentrazone-ethyl	Ethalfuralin	Methidathion	Tebuconazole
Chlorfenapyr	Ethiofencarb	Methiocarb	Tebufenpyrad
Chlordane (cis)	Ethion	Metolachlor	Tecnazene
Chlordane (trans)	Ethoprofos	Metribuzin	Tefluthrin
Chlorfenvinphos	Ethoxyquin	Mevinphos	Terbacil
Chlorobenzilate	Etoxazole	Molinate	Terbufos
Chlorothalonil	Etridiazole	Myclobutanil	Terbutylazine
Chlorpropham	Etrimfos	Napropamide	Terbutryn
Chlorpyrifos	Famphur	Nitrofen	Tetrachlorvinphos
Chlorpyrifos-methyl	Fenarimol	Nitrothal-isopropyl	Tetraconazole
Chlozolate	Fenamiphos	Norflurazon	Tetradifon
Chlorthal-dimethyl	Fenchlorphos	Oxadiazon	Thenylchlor
Clodinafop-propargyl	Fenitrothion	Oxadixyl	Thiobencarb
Clomazone	Fenobucarb	Oxyfluorfen	Thiometon
Cloquintocet-mexyl	Fenoxanil	Paclobutrazol	Tolclofos-methyl
Coumafos	Fenoxaprop-ethyl	Parathion	Tolyfluanid
Cyanazine	Fenoxycarb	Parathion-methyl	Tralkoxydim
Cyanophos	Fenpiclonil	Penconazole	Triadimefon
Cyflufenamid	Fenpropathrin	Pendimethalin	Triadimenol
Cyfluthrin	Fenpropimorph	Permethrin (cis,trans)	Triallate
Cyhalofop-butyl	Fensulfothion	Phenthoate	Tribuphos
Cyhalothrin	Fenthion	Phorate	Triazophos
Cypermethrin	Fenvalerate	Phorate sulphone	Trifloxystrobin
Cyproconazole	Fipronil	Phorate sulphoxide	Trifluralin
Cyprodinil	Flamprop-methyl	Phosalone	Uniconazole P
DDD (o,p')	Fluacrypyrim	Phosmet	Vinclozolin
DDD (p,p')	Fluazifop-p-butyl	Phosphamidon	XMC
DDE (o,p')	Fluazinam	Picolinafen	
DDE (p,p')	Flucythrinate	Piperonyl butoxide	
DDT (o,p')	Fludioxonil	Piperophos	

#**Note:** Captan analysed by gas chromatography with electron capture detection.

***Note:** Results are reported on an as-received basis. Additionally some pesticides may not be determined from all product types should that product prove intractable during analysis.

Pesticides by GC-MSMS	Oils*		
Units	mg/kg		
Compound	Compound	Compound	Compound
Acetochlor	DDT (p,p')	Flucythrinate	Piperonyl butoxide
Alachlor	Deltamethrin	Flumiclorac pentyl	Piperophos
Aldrin	Demeton-s-methyl	Flumioxazin	Pirimicarb
Allidochlor	Diazinon	Fluquinconazole	Pirimiphos-methyl
Ametryn	Dichlobenil	Flusilazole	Pretilachlor
Anilofos	Dichlofenthion	Flutolanil	Prochloraz
Atrazine	Dichlofluanid	Flutriafol	Procymidone
Azaconazole	Dichloran	Fluvalinate	Profenofos
Azinphos-methyl	Dicofol	Fonofos	Promecarb
Azoxystrobin	Dichlorvos	Furalaxyl	Prometryn
Benalaxyl	Diclobutrazol	Furathiocarb	Propachlor
Bendiocarb	Diclofop-methyl	Haloxypop-etotyl	Propargite
Benfluralin	Dicrotophos	Haloxypop-methyl	Propazine
Benodanil	Dieldrin	Heptachlor	Propetamphos
Benoxacor	Diethofencarb	Heptachlor epoxide	Propham
BHC (alpha)	Difenoconazole	Heptenophos	Propiconazole
BHC (beta)	Diflufenican	Hexachlorobenzene	Propoxur
BHC (delta)	Dimepiperate	Hexaconazole	Propyzamide
Bifenox	Dimethenamid	Hexazinone	Prothiofos
Bifenthrin	Dimethoate	Indoxacarb	Pyraclostrobin
Bitertanol	Dimethomorph	Iodofenphos	Pyraflufen ethyl
Bromacil	Dimethylvinphos	Iprobenfos	Pyrazophos
Bromobutide	Dioxabenzofos	Iprodione	Pyributicarb
Bromophos-ethyl	Diphenamid	Iprovalicarb	Pyridaben
Bromophos	Diphenylamine	Isazophos	Pyridafenthion
Bromopropylate	Disulfoton	Isofenphos	Pyrimethanil
Bupirimate	Dithiopyr	Isoprocab	Pyrimidifen
Buprofezin	Edifenphos	Isoprothiolane	Pyriminobac-methyl(E)
Butachlor	Endosulfan sulphate	Kresoxim-methyl	Pyriminobac-methyl(Z)
Butafenacil	Endosulfan (alpha)	Lactofen	Pyriproxyfen
Butamifos	Endosulfan (beta)	Leptophos	Quinalphos
Cadusafos	Endrin	Lindane	Quinoxyfen
Carbaryl	EPN	Linuron	Quintozone
Carbofuran	Epoxiconazole	Malathion	Quizalofop-ethyl
Carfentrazone-ethyl	EPTC	Mepronil	Simazine
Chlorfenapyr	Esfenvalerate	Metalaxyl	Simeconazole

Pesticides by GC-MSMS	Oils*		
Chlordane (cis)	Esprocarb	Methacrifos	Simetryn
Chlordane (trans)	Ethalfuralin	Methidathion	Sulfentrazone
Chlorfenvinphos	Ethiofencarb	Methiocarb	Tebuconazole
Chlorobenzilate	Ethion	Metolachlor	Tebufenpyrad
Chlorothalonil	Ethoprosfos	Metribuzin	Tecnazene
Chlorpropham	Etoxazole	Mevinphos	Tefluthrin
Chlorpyrifos	Etridiazole	Molinate	Terbacil
Chlorpyrifos-methyl	Etrimfos	Myclobutanil	Terbufos
Chlozolate	Famphur	Napropamide	Terbutylazine
Chlorthal-dimethyl	Fenarimol	Nitrofen	Terbutryn
Clodinafop-propargyl	Fenamiphos	Nitrothal-isopropyl	Tetrachlorvinphos
Clomazone	Fenchlorphos	Norflurazon	Tetraconazole
Cloquintocet-mexyl	Fenitrothion	Oxadiazon	Tetradifon
Coumafos	Fenobucarb	Oxadixyl	Thenylchlor
Cyanazine	Fenoxanil	Oxyfluorfen	Thiobencarb
Cyanophos	Fenoxaprop-ethyl	Paclobutrazol	Thiometon
Cyflufenamid	Fenoxycarb	Parathion	Tolclofos-methyl
Cyfluthrin	Fenpiclonil	Parathion-methyl	Tolyfluanid
Cyhalofop-butyl	Fenpropathrin	Penconazole	Tralkoxydim
Cyhalothrin	Fenpropimorph	Pendimethalin	Triadimefon
Cypermethrin	Fensulfothion	Permethrin (cis,trans)	Triadimenol
Cyproconazole	Fenthion	Phenthoate	Triallate
Cyprodinil	Fenvalerate	Phorate	Tribuphos
DDD (o,p')	Fipronil	Phorate sulphone	Triazophos
DDD (p,p')	Flamprop-methyl	Phosalone	Trifloxystrobin
DDE (o,p')	Fluacrypyrim	Phosmet	Trifluralin
DDE (p,p')	Fluazifop-p-butyl	Phosphamidon	Vinclozolin
DDT (o,p')	Fluazinam	Picolinafen	

***Note:** Results are reported on an as-received basis. Additionally some pesticides may not be determined from all product types should that product prove intractable during analysis.

Pesticides by LC-MS/MS (Extended)	Fruit , Vegetables and Oils*		
Units	mg/kg		
Abamectin	Diclotophos	Hexaconazole	Propachlor
Acephate	Diethofencarb	Hexaflumuron	Propamocarb
Acetamiprid	Difenoconazole	Hexazinone	Propanil
Acetochlor	Diflubenzuron	Hexythiazox	Propaphos
Acibenzolar-S-methyl	Diflufenican	Imazalil	Propaquizafop
Acifluorfen	Dimepiperate	Imazamethabenz-methyl	Propargite
Alachlor	Dimethenamid	Imazosulfuron	Propazine
Alanycarb	Dimethoate	Imidacloprid	Propham
Aldicarb	Dimethomorph	Inabenfide	Propiconazole
Aldicarb-sulfone	Dimethylvinphos	Indanofan	Propoxur
Aldicarb-sulfoxide	Dioxathion	Indoxacarb	Propyzamide
Allidochlor	Diphenamid	Iodofenphos	Prosulfocarb
Ametryn	Disulfoton	Iodosulfuron-methyl	Pymetrozine
Anilofos	Dithiopyr	Iprobenfos	Pyraclostrobin
Atrazine	Diuron	Iprovalicarb	Pyrazophos
Azaconazole	Dodine	Isazophos	Pyributicarb
Azamethiphos	Edifenphos	Isofenphos	Pyridaben
Azinphos-methyl	Emamectin Benzoate	Isofenphos-methyl	Pyridafenthion
Azoxystrobin	Epoxiconazole	Isoprocab	Pyrifenoxy
Benalaxyl	EPTC	Isoprothiolane	Pyriotalid
Bendiocarb	Esprocarb	Isoproturon	Pyrimethanil
Benfluralin	Ethalfuralin	Isoxathion	Pyrimidifen
Benfuracarb	Ethametsulfuron-methyl	Karbutilate	Pyriminobac-methyl(E)
Benodanil	Ethion	Lactofen	Pyriminobac-methyl(Z)
Benoxacor	Ethiprole	Lenacil	Pyriproxyfen
Bensulfuron-methyl	Ethoprofos	Linuron	Pyroquilon
Bensulide	Ethoxyquin	Lufenuron	Quinalphos
Bifenox	Ethoxysulfuron	Malathion	Quinoclamine
Bitertanol	Ethychlozate	Mandipropamid	Quinoxifen
Boscalid	Etobenzanid	Mefenacet	Quizalofop-ethyl
Bromacil	Etoazole	Mefenpyr-diethyl	Rimsulfuron
Bromobutide	Etrifos	Mepanipyrim	Sethoxydim
Bupirimate	Famoxadone	Mepronil	Simazine
Buprofezin	Famphur	Metalaxyl	Simeconazole
Butachlor	Fenamidone	Metamitron	Simetryn
Butafenacil	Fenamifos	Metconazole	Spinetoram

<i>Pesticides by LC-MS/MS (Extended)</i>	<i>Fruit , Vegetables and Oils*</i>		
Butamifos	Fenarimol	Methabenzthiazuron	Spinosad
Cadusafos	Fenbuconazole	Methacrifos	Spiromesifen
Cafenstrole	Fenchlorphos	Methamidophos	Spiromesifen-enol
Carbaryl	Fenhexamid	Methidathion	Spirotetramat
Carbendazim	Fenobucarb	Methiocarb	Spiroxamine
Carbetamide	Fenothiocarb	Methomyl	Sulfentrazone
Carbofuran	Fenoxanil	Methoxyfenozide	Sulprofos
Carfentrazone-ethyl	Fenoxaprop	Metobromuron	Tebuconazole
Carpropamid	Fenoxaprop-ethyl	Metolachlor	Tebufenozide
Chlorantraniliprole	Fenoxycarb	Metominostrobin (E)	Tebufenpyrad
Chlorbufam	Fenpiclonil	Metominostrobin (Z)	Tebuthiuron
Chlorfenvinphos	Fenpropathrin	Metosulam	Teflubenzuron
Chloridazon	Fenpropimorph	Metribuzin	Temephos
Chlorimuron-ethyl	Fenpyroximate	Mevinphos	Tepraloxymid
Chlorotoluron	Fensulfothion	Milbemectin	Terbufos
Chloroxuron	Fenthion	Molinate	Terbumeton
Chlorpropham	Fenthion sulfone	Monocrotophos	Terbutryn
Chlorpyrifos	Fenthion sulfoxide	Monolinuron	Terbutylazine
Chlorpyrifos-methyl	Fentrazamide	Myclobutanil	Tetrachlorvinphos
Chlorsulfuron	Ferimzone	Napropamide	Tetraconazole
Chromafenozide	Fipronil	Nicotine	Thenylchlor
Cinidon- ethyl	Flamprop	Norflurazon	Thiabendazole
Clethodim	Flamprop-methyl	Novaluron	Thiacloprid
Clodinafop-propargyl	Flazasulfuron	Omethoate	Thiamethoxam
Clofentezine	Fluacrypyrim	Oryzalin	Thiazopyr
Clomazone	Fluazifop-p-butyl	Oxabetrinil	Thidiazuron
Cloquintocet-mexyl	Fludioxonil	Oxadiazon	Thiobencarb
Clothianidin	Flufenacet	Oxadixyl	Thiocyclam hydrogenoxalate
Coumafos	Flumiclorac pentyl	Oxamyl	Thiometon
Coumaphos oxon	Flumioxazin	Oxycarboxin	Tiadinil
Cyanazine	Fluometuron	Paclobutrazol	Tolclofos-methyl
Cyazofamid	Fluquinconazole	Penconazole	Tolyfluanid
Cyclanilide	Fluridone	Pencycuron	Tralkoxydim
Cycloate	Flusilazole	Pendimethalin	Triadimefon
Cyclosulfamuron	Flusulfamide	Phenmedipham	Triadimenol
Cyflufenamid	Fluthiacet-methyl	Phenthoate	Triallate
Cymoxanil	Flutolanil	Phorate	Triasulfuron
Cyproconazole	Flutriafol	Phorate sulphone	Triazophos

Pesticides by LC-MS/MS (Extended)	Fruit , Vegetables and Oils*		
Cyprodinil	Folpet	Phorate sulphoxide	Tribenuron-methyl
Cyromazine	Fomesafen	Phosalone	Tribuphos
Daimuron	Fonofos	Phosphamidon	Trichlorfon
Demeton-s-methyl	Forchlorfenuron	Phoxim	Tricyclazole
Demeton-s-methyl-sulfoxide	Formetanate hydrochloride	Picolinafen	Trifloxystrobin
Desmedipham	Fosthiazate	Piperonyl butoxide	Trifloxysulfuron sodium
Di-allate	Fuberidazole	Piperophos	Triflumizole
Diazinon	Furalaxyl	Pirimicarb	Triflumuron
Dichlofenthion	Furametpyr	Pirimiphos-methyl	Triflusulfuron-methyl
Dichlofluanid	Furathiocarb	Pretilachlor	Triforine
Diclobutrazol	Halosulfuron-methyl	Prochloraz	Uniconazole P
Diclocymet	Haloxypop-etotyl	Profenofos	Vamidothion
Diclofop-methyl	Haloxypop-methyl	Promecarb	XMC
Diclosulam	Heptenophos	Prometryn	Zoxamide

***Note:** Results are reported on an as-received basis. Additionally some pesticides may not be determined from all product types should that product prove intractable during analysis.

Dithiocarbamates by GC-MSMS
Units mg/kg
Dithiocarbamates including:
Mancozeb (as carbon disulphide)
Maneb (as carbon disulphide)
Metam (as carbon disulphide)
Metham (as carbon disulphide)
Metiram (as carbon disulphide)
Propineb (as carbon disulphide)
Thiram (as carbon disulphide)
Zineb (as carbon disulphide)
Ziram (as carbon disulphide)

***Note:** Results are reported on an as-received basis. Additionally some pesticides may not be determined from all product types should that product prove intractable during analysis.