



FRSP 2011-2012

Quarterly Report

Quarter Two

Prepared by Chemical & Microbiological Assurance Team

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Contents	Page
Summary	1
Introduction	2
Products tested during quarter two	3
Sampling	3
Methodology	3
Results	4
Detections (Pesticides)	4
Conclusion	9
Appendix 1: Pesticides tested in FRSP 2011	10

Summary

The Food Residue Surveillance Programme (FRSP) is an annual surveillance programme that is 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 two eggplant, lemons, walnuts, spring onion, pumpkin, asparagus, hops and tamarillos were tested. No residues were found in any of the hop samples. Residue results for eggplant, lemons, walnuts and pumpkin samples tested in quarter two were all compliant.

One sample of asparagus was non-compliant for three MRLs (bromacil, metalaxyl and diuron). Three samples of spring onion had non-compliant residue results for the MRL for triadimenol and breaches of deltamethrin were found in four of the remaining tamarillo samples that were tested in quarter two. None of the above non-compliances posed a risk to human health.

Four samples of organic walnuts were found to contain a residue that is indicative of the presence of dithiocarbamates. The cause of these findings is uncertain as this residue found is also found to be generated by some naturally occurring chemicals in plants so it will be difficult to ascertain whether the levels detected were result of agricultural chemical use. Additionally, one sample of organic lemons was found to contain residues of malathion. While the residues were within the MRL and do not represent a food safety issue, this compound are unexpected in organic produce. This breach of organic production practise is being referred to the Commerce Commission.

MPI is following up on the other breaches and the results of these investigations will be reported in the report at the end of the annual testing period.

Introduction

The Food Residue Surveillance Programme (FRSP) is an annual surveillance programme that is 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. Maximum Residue Limits (MRLs) for pesticides are established to promote good agricultural practice (GAP) in the use of insecticides, fungicides, herbicides and other agricultural compounds.

Results will be reported after each quarter of testing. Previously results were released in a spreadsheet format. This year MPI are 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 (around August 2012).

FRSP 2011 is sampling and testing twelve food commodities during May 2011 through to April 2012. The products sampled and tested in quarter two include:

- Eggplant
- Lemons
- Walnuts
- Spring Onion
- Pumpkin
- Asparagus
- Hops

Also included in this report are samples that were collected in quarter one and tested in quarter two. These include:

- Tamarillo
- Hops

Products tested during quarter two

SAMPLING

MPI collected the samples.

METHODOLOGY

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

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

Dithiocarbamates were also tested for (as carbon disulphide) using GC-MS/MS.

For fruit and vegetables the GC-MS/MS multi-residue screening method was able to detect residues of 265 pesticides, with 352 pesticides being detectable in the LC-MS/MS multi-residue method (some of these also being in the GC-MS/MS suite).

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

Results

Testing of eggplant, asparagus, hops and pumpkin has been completed during the second quarter (August through to October).

In this period lemons, spring onions and walnuts were also tested. Further testing of these products will occur later in the sampling year.

Tamarillo results for seven samples and hop results for 24 samples that were collected in quarter one are included in this report. This is because the results for these samples were unavailable when the quarter one report was published.

Table 1 shows a summary of the quarter two results

Table 1: Quarter 2 Samples Taken

Product	Total Samples Collected in Quarter 2	Total Samples specified during reporting period	Carry over from Quarter 1	Total Number of residue detections
Lemons (Domestic)	24	24		62
Spring Onion (Domestic)	24	24		79
Pumpkin (Domestic)	24	24		4
Eggplant (Domestic)	24	24		10
Asparagus (Domestic)	24	24		9
Hops (Domestic)	24	24	24	0
Tamarillo (Domestic)	0	0	7	15
Walnuts (Domestic/Imported)	24	24		5
Table Totals	168	168	31	184

DETECTIONS (PESTICIDES)

Table 2: Detections in Lemons

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
FRSP208	0.11	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP208	0.077	0.5mg/kg (NZ)	Diazinon	GC-MS
FRSP208	0.054	8mg/kg (NZ)	Malathion	GC-MS
FRSP208	0.1	0.5mg/kg (NZ)	Diazinon	LCMSMS
FRSP208	0.089	8mg/kg (NZ)	Malathion	LCMSMS
FRSP209	0.11	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP209	0.066	0.5mg/kg (NZ)	Diazinon	GC-MS
FRSP209	0.026	8mg/kg (NZ)	Malathion	GC-MS
FRSP209	0.095	0.5mg/kg (NZ)	Diazinon	LCMSMS
FRSP209	0.038	8mg/kg (NZ)	Malathion	LCMSMS
FRSP212	0.056	0.1mg/kg (default NZ limit)	Kresoxim-methyl	GC-MS
FRSP212	0.075	8mg/kg (NZ)	Malathion	GC-MS
FRSP212	0.013	0.1mg/kg (default NZ limit)	Azoxystrobin	LCMSMS
FRSP212	0.026	5mg/kg (NZ)	Carbendazim	LCMSMS
FRSP212	0.11	8mg/kg (NZ)	Malathion	LCMSMS
FRSP213	0.47	8mg/kg (NZ)	Malathion	GC-MS

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
FRSP213	0.43	8mg/kg (NZ)	Malathion	LCMSMS
FRSP220	0.23	8mg/kg (NZ)	Malathion	GC-MS
FRSP220	0.26	8mg/kg (NZ)	Malathion	LCMSMS
FRSP221	0.033	0.1mg/kg (default NZ limit)	Propham	GC-MS
FRSP221	0.052	0.1mg/kg (default NZ limit)	Propham	LCMSMS
FRSP226	0.19	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP226	0.02	0.5mg/kg (NZ)	Buprofezin	GC-MS
FRSP226	0.66	8mg/kg (NZ)	Malathion	GC-MS
FRSP226	0.031	0.5mg/kg (NZ)	Buprofezin	LCMSMS
FRSP226	0.62	8mg/kg (NZ)	Malathion	LCMSMS
FRSP227	0.021	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP227	0.014	8mg/kg (NZ)	Malathion	GC-MS
FRSP227	0.013	8mg/kg (NZ)	Malathion	LCMSMS
FRSP231	0.038	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP232	0.021	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP232	0.012	0.5mg/kg (NZ)	Diazinon	GC-MS
FRSP232	0.22	8mg/kg (NZ)	Malathion	GC-MS
FRSP232	0.013	5mg/kg (NZ)	Acephate	LCMSMS
FRSP232	0.017	0.5mg/kg (NZ)	Diazinon	LCMSMS
FRSP232	0.33	8mg/kg (NZ)	Malathion	LCMSMS
FRSP240	0.073	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP241	0.13	5mg/kg (NZ)	Acephate	LCMSMS
FRSP241	0.22	0.5mg/kg (NZ)	Methamidophos	LCMSMS
FRSP244	0.21	8mg/kg (NZ)	Malathion	GC-MS
FRSP244	0.28	8mg/kg (NZ)	Malathion	LCMSMS
FRSP250	0.033	0.1mg/kg (default NZ limit)	Propham	GC-MS
FRSP250	0.051	0.1mg/kg (default NZ limit)	Propham	LCMSMS
FRSP251	0.051	8mg/kg (NZ)	Malathion	GC-MS
FRSP251	0.27	5mg/kg (NZ)	Carbendazim	LCMSMS
FRSP251	0.088	8mg/kg (NZ)	Malathion	LCMSMS
FRSP256	0.11	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP256	0.019	0.5mg/kg (NZ)	Buprofezin	GC-MS
FRSP256	0.095	5mg/kg (NZ)	Acephate	LCMSMS
FRSP256	0.032	0.5mg/kg (NZ)	Buprofezin	LCMSMS
FRSP256	0.013	0.5mg/kg (NZ)	Methamidophos	LCMSMS
FRSP258	0.25	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP258	0.013	0.2mg/kg (NZ)	Chlorpyrifos	LCMSMS
FRSP263	0.13	8mg/kg (NZ)	Malathion	GC-MS
FRSP263	0.2	8mg/kg (NZ)	Malathion	LCMSMS
FRSP269	0.061	8mg/kg (NZ)	Malathion	GC-MS
FRSP269	0.1	8mg/kg (NZ)	Malathion	LCMSMS
FRSP274	0.062	0.5mg/kg (NZ)	Diazinon	GC-MS
FRSP274	0.13	0.5mg/kg (NZ)	Diazinon	LCMSMS
FRSP275	0.26	8mg/kg (NZ)	Malathion	GC-MS
FRSP275	0.012	0.5mg/kg (NZ)	Buprofezin	LCMSMS
FRSP275	0.36	8mg/kg (NZ)	Malathion	LCMSMS

Note: Samples 263 was collected as an organic sample of lemons.

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

Table 3: Detections in Spring Onion

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
FRSP278	0.11	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP278	0.018	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP278	0.019	0.2mg/kg (NZ)	Triadimenol	LCMSMS

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
FRSP283	0.029	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP283	0.027	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP285	0.095	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP285	0.015	0.05mg/kg (NZ)	Methabenzthiazuron	LCMSMS
FRSP290	0.23	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP290	0.13	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP290	0.11	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP291	1.5	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP291	0.088	0.1mg/kg (default NZ limit)	Chlorpyrifos	GC-MS
FRSP291	0.022	0.1mg/kg (default NZ limit)	Cyanazine	GC-MS
FRSP291	0.095	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP291	0.11*	0.1mg/kg (default NZ limit)	Chlorpyrifos	LCMSMS
FRSP291	0.026	0.1mg/kg kg (default NZ limit)	Cyanazine	LCMSMS
FRSP291	0.075	0.1mg/kg kg (default NZ limit)	Fenamidone	LCMSMS
FRSP291	0.077	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP293	0.22	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP294	0.18	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP294	0.033	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP294	0.023	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP298	0.21	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP298	0.23	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP298	0.012	0.1mg/kg (default NZ limit)	Dimethomorph	LCMSMS
FRSP298	0.28	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP299	0.19	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP299	0.21*	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP299	0.33	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP300	0.09	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP300	0.018	0.1mg/kg (default NZ limit)	Cyproconazole	GC-MS
FRSP300	0.021	0.1mg/kg (default NZ limit)	Cyproconazole	LCMSMS
FRSP301	0.11	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP301	0.013	0.05mg/kg (NZ)	Iprovalicarb	LCMSMS
FRSP305	2	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP305	0.059	0.1mg/kg (default NZ limit)	Chlorpyrifos	GC-MS
FRSP305	0.032	0.1mg/kg (default NZ limit)	Dimethomorph	GC-MS
FRSP305	0.21*	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP305	0.12*	0.1mg/kg (default NZ limit)	Carbendazim	LCMSMS
FRSP305	0.039	0.1mg/kg (default NZ limit)	Chlorpyrifos	LCMSMS
FRSP305	0.038	0.1mg/kg (default NZ limit)	Dimethomorph	LCMSMS
FRSP305	0.29	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP306	0.48	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP306	0.025	0.1mg/kg (default NZ limit)	Dimethomorph	GC-MS
FRSP306	0.14	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP306	0.021	0.1mg/kg (default NZ limit)	Dimethomorph	LCMSMS
FRSP306	0.012	0.2mg/kg (NZ)	Mandipropamid	LCMSMS
FRSP306	0.21*	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP309	0.21	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP309	0.047	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP309	0.066	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP310	0.082	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP310	0.016	0.1mg/kg (default NZ limit)	Cyproconazole	GC-MS
FRSP310	0.025	0.1mg/kg (default NZ limit)	Cyproconazole	LCMSMS
FRSP312	0.09	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP314	0.02	0.1mg/kg (default NZ limit)	Dimethomorph	GC-MS
FRSP314	0.19	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP314	0.026	0.1mg/kg (default NZ limit)	Dimethomorph	LCMSMS
FRSP314	0.2*	0.2mg/kg (NZ)	Triadimenol	LCMSMS

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
FRSP315	0.22	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP315	0.076	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP315	0.084	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP318	0.13	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP318	0.023	0.05mg/kg (NZ)	Methabenzthiazuron	LCMSMS
FRSP319	0.34	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP321	0.22	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP321	0.18	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP321	0.011	0.1mg/kg (default NZ limit)	Dimethomorph	LCMSMS
FRSP321	0.2*	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP323	0.19	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP323	0.011	0.1mg/kg (default NZ limit)	Dimethomorph	GC-MS
FRSP323	0.15	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP323	0.014	0.1mg/kg (default NZ limit)	Dimethomorph	LCMSMS
FRSP323	0.24*	0.2mg/kg (NZ)	Triadimenol	LCMSMS
FRSP333	0.47	7mg/kg (NZ)	Dithiocarbamates	GC-MS
FRSP333	0.011	0.1mg/kg (default NZ limit)	Dimethomorph	GC-MS
FRSP333	0.071	0.2mg/kg (NZ)	Triadimenol	GC-MS
FRSP333	0.016	0.1mg/kg (default NZ limit)	Dimethomorph	LCMSMS
FRSP333	0.052	0.2mg/kg (NZ)	Triadimenol	LCMSMS

3 non compliant samples identified in spring onion (highlighted in table). (FRSP298, FRSP299 and FRSP305).

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

Table 4: Detections in Egg Plant

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
FRSP215	0.13	0.5mg/kg (NZ)	Methomyl	LCMSMS
FRSP218	0.016	0.5mg/kg (NZ)	Buprofezin	LCMSMS
FRSP218	0.088	0.5mg/kg (NZ)	Methomyl	LCMSMS
FRSP219	0.11	0.5mg/kg (NZ)	Methomyl	LCMSMS
FRSP224	0.049	0.5mg/kg (NZ)	Methomyl	LCMSMS
FRSP225	0.038	0.1mg/kg (default NZ limit)	Propamocarb	LCMSMS
FRSP242	0.048	0.1mg/kg (default NZ limit)	Imidacloprid	LCMSMS
FRSP243	0.022	0.5mg/kg (NZ)	Methomyl	LCMSMS
FRSP259	0.01	0.1mg/kg (default NZ limit)	Pymetrozine	LCMSMS
FRSP260	0.18	0.2mg/kg (NZ)	Methamidophos	LCMSMS

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

Table 5: Detections in Asparagus

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
FRSP335	0.23	0.1mg/kg (default NZ limit)	Bromacil	GC-MS
FRSP335	0.6	0.2mg/kg (NZ)	Metalaxyl	GC-MS
FRSP335	0.25	0.1mg/kg (default NZ limit)	Bromacil	LCMSMS
FRSP335	0.35	0.1mg/kg (default NZ limit)	Diuron	LCMSMS
FRSP335	0.38	0.2mg/kg (NZ)	Metalaxyl	LCMSMS
FRSP342	0.014	0.1mg/kg (default NZ limit)	Bromacil	GC-MS
FRSP342	0.018	0.1mg/kg (default NZ limit)	Bromacil	LCMSMS
FRSP342	0.012	0.1mg/kg (default NZ limit)	Diuron	LCMSMS
FRSP364	0.031	7mg/kg (NZ)	Dithiocarbamates	GC-MS

1 non compliant sample identified in asparagus (highlighted in table). (FRSP335)

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

Table 6: Detections in Pumpkins

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
FRSP295	0.022	0.1mg/kg (default NZ limit)	Propham	GC-MS
FRSP295	0.035	0.1mg/kg (default NZ limit)	Propham	LCMSMS
FRSP325	0.056	0.1mg/kg (default NZ limit)	Propham	GC-MS
FRSP325	0.07	0.1mg/kg (default NZ limit)	Propham	LCMSMS

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

Table 7: Detections in Walnuts

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
FRSP228	0.029	0.1mg/kg (default NZ limit)	Dithiocarbamates	GC-MS
FRSP239	0.036	0.1mg/kg (default NZ limit)	Dithiocarbamates	GC-MS
FRSP252	0.054	0.1mg/kg (default NZ limit)	Dithiocarbamates	GC-MS
FRSP271	0.022	0.1mg/kg (default NZ limit)	Dithiocarbamates	GC-MS
FRSP391	0.053	0.1mg/kg (default NZ limit)	Dithiocarbamates	GC-MS

Note: Samples FRSP228, FRSP239, FRSP271 and FRSP391 were collected as organic samples of walnut.s

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

Table 8: Detections in Tamarillo

Sample #	Results (mg/kg)	Maximum Residue Limit (MRL)	Pesticide	Methodology
FRSP183	0.026	0.02 mg/kg (NZ)	Deltamethrin	GC-MS
FRSP184	0.01	0.5 mg/kg (NZ)	Diazinon	GC-MS
FRSP188	0.036	0.02 mg/kg (NZ)	Deltamethrin	GC-MS
FRSP188	0.033	0.1 mg/kg (default NZ limit)	Permethrin	GC-MS
FRSP190	0.055	0.02 mg/kg (NZ)	Deltamethrin	GC-MS
FRSP190	0.051	0.1 mg/kg (default NZ limit)	Permethrin	GC-MS
FRSP190	0.013	0.1 mg/kg (default NZ limit)	Pirimiphos-methyl	GC-MS
FRSP196	0.016	0.5 mg/kg (NZ)	Diazinon	GC-MS
FRSP196	0.011	0.5 mg/kg (NZ)	Diazinon	LCMSMS
FRSP199	0.029	0.02 mg/kg (NZ)	Deltamethrin	GC-MS
FRSP199	0.026	0.1 mg/kg (default NZ limit)	Permethrin	GC-MS
FRSP199	0.013	0.1 mg/kg (default NZ limit)	Pirimiphos-methyl	GC-MS
FRSP199	0.011	0.1 mg/kg (default NZ limit)	Pirimiphos-methyl	LCMSMS
FRSP200	0.017	0.02 mg/kg (NZ)	Deltamethrin	GC-MS
FRSP200	0.013	0.1 mg/kg (default NZ limit)	Permethrin	GC-MS

4 non compliant samples identified in tamarillos (highlighted in table). (FRSP183, FRSP188, FRSP190 and FRSP199)

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

Conclusion

Residues were found in seven out of eight of the product categories tested (no residues found in hops). However, residue results for eggplant, lemons, walnuts and pumpkin samples tested in quarter two were all compliant.

Breaches of the MRL for bromacil, metalaxyl and diuron were found in one of the twenty four asparagus samples collected. Breaches of the MRL for triadimenol were found in three samples of the twenty four spring onion samples collected. Also breaches of deltamethrin were found in four of the remaining tamarillo samples that were tested in quarter two. Non-compliant residues could suggest that GAP has not been complied with but none of these non-compliances posed a risk to human health.

Four samples of organic walnuts were found to contain a residue that is indicative of the presence of dithiocarbamates. The cause of these findings is uncertain as this residue found is also found to be generated by some naturally occurring chemicals in plants so it will be difficult to ascertain whether the levels detected were result of agricultural chemical use. Additionally, one sample of organic lemons was found to contain residues of malathion. While the residues were within the MRL and do not represent a food safety issue, this compound is unexpected in organic produce. This breach of organic production practise is being referred to the Commerce Commission.

MPI is following up on the other breaches and the results of these investigations will be reported in the report at the end of the annual testing period.

Appendix 1: Pesticides tested in FRSP 2011

<i>Pesticides by GC-MS</i>	<i>Fruit and Vegetables*</i>		
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	Quintozene
Cadusafos	EPN	Linuron	Quizalofop-ethyl
Captan [#]	Epoxiconazole	Malathion	Simazine
Carbaryl	EPTC	Mepronil	Simeconazole

<i>Pesticides by GC-MS</i>	<i>Fruit and Vegetables*</i>		
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 recoverable from all product types should that product prove intractable during analysis.

<i>Pesticides by LC-MS/MS (Extended)</i>	<i>Fruit , Vegetables and Oils*</i>		
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

<i>Pesticides by LC-MS/MS (Extended)</i>	<i>Fruit , Vegetables and Oils*</i>		
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 recoverable from all product types should that product prove intractable during analysis.

<i>Dithiocarbamates by GC-MS</i>
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 recoverable from all product types should that product prove intractable during analysis.