Government of **Western Australia**
Department of **Health**

WESTERN AUSTRALIAN FOOD MONITORING PROGRAM

Monitoring Agricultural Chemical Residue Levels in Fresh Fruit and Vegetables

This report provides the summary of results of surveys conducted in 2009, 2011, 2013 and 2015.

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Kwinana
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Melville
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Mosman Park
Murray
Nannup
Nedlands
Peppermint Grove
Perth
Port Hedland
Rockingham
Serpentine-Jarrahdale
South Perth
Stirling
Subiaco
Swan
Victoria Park
Vincent
Wanneroo
Waroona
Wyndham-East Kimberley

Monitoring purpose and scope

The purpose and scope of testing was to:

- monitor the level of agricultural chemical residues on fresh fruit and vegetables available for sale in the market, for compliance with the maximum residue limits (MRLs) prescribed under Standard 1.4.2 – Maximum Residue Limits, of the *Australia New Zealand Food Standards Code* (Food Standards Code);

- notify the appropriate enforcement agencies where test results are non-compliant with the Food Standards Code; and

- use the survey findings to inform future compliance programs.

Key findings

- Food safety risks associated with agricultural chemical residues in fresh fruit and vegetables were low. Test results from surveys conducted in 2009, 2011, 2013 and 2015 reported that overall, 90% of samples tested were compliant. Compliance was determined where no chemical residues were detected or where a residue level did not exceed a set MRL under Standard 1.4.2 of the Food Standards Code.

- Non-compliance was determined where a residue level was detected and exceeded a set MRL or, where there was no set MRL under Standard 1.4.2. In total, the number of non-compliant samples was higher where samples were detected with a chemical residue that did not have a set MRL. These findings support plans by Food Standards Australia New Zealand (FSANZ) to consider a variation to Standard 1.4.2 to permit the sale of food with low levels of residues, where unexpected exposure to agricultural and veterinary chemicals has been determined.

- Overall, food safety risks associated with agricultural chemical residues in fresh fruit and vegetables were managed by an industry-based horticultural residue testing program. The majority of fruit and vegetables sold at the retail level were sourced from wholesale central markets, where food safety risks were managed by ‘Fresh Test’, a residue testing program provided by the Chamber of Fruit and Vegetable Industries Western Australia.

- The supply chain of fresh fruit and vegetables from farm to retail sale was complex, often involving multiple suppliers. In addition, grower details were not often maintained at the retail level. These findings support plans by FSANZ to examine traceability requirements for all industry sectors and supply chains.

Background

Regulation of agricultural chemicals

Agricultural chemicals are used in food production to control insect pests, fungal diseases and weeds. Whilst the use of these chemicals can control pests and disease, they should be safe to people and the environment. With over 10,000 agricultural and veterinary (agvet) products registered for use in Australia,[1] managing the safe use of these chemicals and the sale of safe and suitable food involves a number of different government agencies and legislation.

The Australian Pesticides and Veterinary Medicines Authority (APVMA) is the statutory authority responsible for the regulation of agvet chemicals up to the point of retail sale. The APVMA has responsibility for determining, through a detailed assessment process, that a chemical is safe to users, consumers, the environment and trade, before it is registered for use in Australia.

The APVMA sets MRLs for approved agvet chemicals, at levels that are not likely to be exceeded if the chemicals are used in accordance with approved label instructions.[2] The MRLs are set under the *Agricultural and Veterinary Chemicals Code Instrument No. 4 (MRL Standard) 2012* and listed under the Food Standards Code. State and territory regulatory agencies are responsible for enforcing the requirements of the Food Standards Code.

Setting maximum residue limits

MRLs are set for a specific agvet chemical on a specific commodity, at a level to ensure the safety of food. At the time the MRLs are set, Australian statutory authorities, the APVMA and FSANZ undertake dietary exposure evaluation to ensure the MRLs do not pose undue risk to human health. The dietary exposure studies are comprehensive using internationally accepted dietary modelling techniques.[3]

Compliance and non-compliance

Compliance is determined where no residues are detected or where a residue level does not exceed a set MRL.

Non-compliance is determined where a residue level is detected and exceeds a set MRL or, where there is no set MRL. Currently, this approach to non-compliance does not allow for low level detection of chemical residues in food that do not have an MRL for that specific registered agvet chemical product. However, non-compliance where a residue is detected in low amounts does not automatically mean the food is unsafe to eat. As the MRLs are set well below the level that would be harmful, low level exceedance of an MRL or, low level detection of registered agvet chemical products that do not have an MRL for a specific food, does not mean the food is unsafe.

Reporting non-compliance

Reporting non-compliance with the MRLs can help enforcement agencies to monitor whether an agvet chemical has been used in accordance with approved label instructions and identify any risks associated with the misuse.

The current approach by enforcement agencies to report non-compliance of low level detection of residues can restrict the sale of safe food in the market. This zero tolerance approach can cause a regulatory burden on industry and enforcement agencies in addressing safe, but non-compliant food. FSANZ recognises this concern and is currently considering a variation to the Food Standards Code, which would seek to permit the sale of food with low levels of residues resulting from unexpected exposure to agvet chemicals listed in Standard 1.4.2.[4]

In Western Australia, residue monitoring data is shared between the Departments of Health, Agriculture and Food, and local government enforcement agencies to effectively manage compliance with the MRLs. The data is also reported to the Pesticides Advisory Committee, a statutory body established under the *Health Act 1911* to co-ordinate pesticide legislation and policies and, where necessary provide advice to the Australian Government. Its membership includes representatives from the Departments of Health, Agriculture and Food, Environment Regulation, Commerce (WorkSafe) and ChemCentre. Observers include the Departments of Water, Mines and Petroleum, Parks and Wildlife, and the APVMA.

Enforcement

The *Food Act 2008* (Food Act) is the principal piece of legislation regulating the production and sale of food in Western Australia with the *Food Regulations 2009* (Food Regulations) as the subsidiary legislation. This legislation provides food safety regulation over the entire food supply chain. The Food Act and the Food Regulations adopt the Food Standards Code which covers cleanliness, sanitation, hygiene, food serving practices and a range of other aspects that go into the preparation and provision of food. The Food Act applies to all food businesses involved in the production and sale of food in Western Australia and encompasses a wide range of food safety issues to ensure that consumers can be confident about the safety of the food they buy and eat.

The Department of Health together with 138 local government enforcement agencies share responsibilities in administering the requirements of the Food Act, Food Regulations and the Food Standards Code, with local government undertaking the majority of compliance and enforcement activities where non-compliance is determined.

In Australia, the *Agricultural and Veterinary Chemicals Code Act 1994* is the principle legislation for the evaluation, registration and control of agvet chemical products. In Western Australia, the *Agricultural and Veterinary Chemicals (Western Australia) Act 1995* authorises the powers of the APVMA and its officers to apply, which is administered by the Department of Agriculture and Food. In addition, the *Health (Pesticides) Regulations 2011* regulates pest management businesses including the possession, use and disposal of pesticides. The Department of Health and local government enforcement agencies share responsibilities in administering the requirements of the Pesticide Regulations.

Other residue monitoring programs

In Western Australia, the Department of Health monitors chemical residues in fresh fruit and vegetables as part of various other food surveys conducted under the Western Australian Food Monitoring Program. Separate to residue monitoring by the Department of Health, a number of other government agencies and industry bodies undertake surveillance programs for chemical residues including –

Government:

- FSANZ Australian Total Diet Study
- Department of Agriculture and Water Resources National Residue Survey
- Victorian Department of Primary Industries Produce Monitoring Program

Industry:

- Chamber of Fruit and Vegetables Industries Western Australia Fresh Test Residue Testing Program
- Woolworths Quality Assurance Program
- Coles Quality Assurance Program

Residue monitoring program

Chemical and commodity selection

A review of results from food monitoring programs used in various horticulture industries in Australia and residue data from overseas monitoring programs was conducted to determine the selection of chemicals and commodities for testing. The following programs were reviewed:

- APVMA - Chemical Review Program
- Department of Agriculture and Water Resources - National Residue Survey and Imported Food Notices
- FSANZ - Australian Total Diet Study
- Victorian Department of Primary Industries - Produce Monitoring Program
- United States Food and Drug Administration - Import Alert System
- Department of Health, Western Australia - Western Australian Food Monitoring Program
- Chamber of Fruit and Vegetable Industries, Western Australia - Fresh Test Residue Testing Program
- Horticulture Industry Guides
- Woolworths - Quality Assurance Program
- Coles - Quality Assurance Program

Consideration of the following criteria was made to determine the range and number of chemicals and commodities to be included:

- Pesticides in current use in the Western Australia market garden industries
- Chemical residues commonly found in overseas and other Australian jurisdictions testing programs
- Chemicals that are likely to be found in seasonal Western Australian produce and, or imported fresh food commodities
- Chemicals that are not included in other monitoring or testing programs
- Commodities found with chemical residues in exceedance of the MRLs
- Pesticides no longer permitted for use in Australia
- Seasonal availability of commodities
- Department of Health and local government resources
- Laboratory analytical capability and costs

Sample collection

Samples of different commodities were taken from retail and wholesale food businesses by local government Environmental Health Officers. Where the commodity could be identified as originating from a single grower, three samples were collected in a random manner, or from a random position in the display. Where the commodity could not be identified as originating from a single grower, then a single sample was selected from a random position.

Laboratory testing

Residue testing of food samples was conducted by the ChemCentre, a NATA accredited facility approved for conducting analyses under the Food Act. ChemCentre's Quality Management System and accredited methodology comply with all relevant clauses of ISO/IEC 17025 and meet the principles of ISO 9001. The systems are actively reviewed and managed and subject to regular external scrutiny by both accreditation bodies.

Reporting results to stakeholders

The local government enforcement agency informed the relevant food businesses where non-compliance with the Food Standards Code was determined. Where possible, further investigation was undertaken by the local government to identify the grower.

Summary of test results

Results from all four monitoring surveys reported that overall, 90% of samples tested were compliant. In total, the number of non-compliant samples was higher where samples were detected with a chemical residue that did not have a set MRL.

Table 1 provides a summary of the number of compliant test results, listing the number of samples tested, the number of chemicals analysed and the number of compliant samples for each survey. Table 2 provides a summary of the number of non-compliant test results where there was no existing MRL and, where MRLs were exceeded.

Table 1. Summary of the number of compliant test results

Year	No. of samples tested	No. of chemicals tested per sample	Total No. of tests	No. of compliant test results	No. of compliant samples
2009	309	71	21,939	21,915	288 (93.2%)
2011	202	72	14,544	14,536	195 (96.5%)
2013	495	106	52,470	52,410	446 (90.1%)
2015	235	84	19,740	19,713	210 (89.4%)
Total	**1,241**				**1,139 (91.8%)**

Table 2. Summary of the number of non-compliant test results

	No. of non-compliant test results	
Year	no MRL	above MRL
2009	23	1
2011	2	6
2013	35	25
2015	11	16
Total	**71**	**48**

Tables 3, 4, 5 and 6 provide a summary of the non-compliant test results for each survey year, listing the chemical-food combinations and the reason for non-compliance.

Table 3. Summary of non-compliant chemical-food results – 2009

Chemical	Total No. non-compliant test results	Commodity	No. of non-compliant test results		Country of origin
			no MRL	above MRL	
Endosulfan	9	Lettuce	6		Australia
		Onion	2		Australia (1), New Zealand (1)
		Spinach	1		Australia
Demeton-S-Methyl	4	Mushroom	4		Australia
Endrin	5	Tomato	4		Australia
		Lettuce	1		Australia
Iprodione	3	Peas	3		Australia (2), China (1)
Methamidophos	1	Peas	1		China
Bioresmethin	1	Mushroom	1		Australia
Chloropyrifos	1	Tomato		1	Australia

Table 4. Summary of non-compliant chemical-food results – 2011

Chemical	Total No. non-compliant test results	Commodity	No. of non-compliant test results		Country of origin
			no MRL	above MRL	
Demeton-S-Methyl	2	Strawberry	2		Australia
Cypermethrin	2	Tomato		1	Australia
		Capsicum		1	Australia
Bifenthrin	2	Capsicum		2	Australia
Chlorpyrifos	1	Capsicum		1	Australia
Methiocarb	1	Orange		1	Israel

Table 5. Summary non-compliant chemical-food results – 2013

Chemical	Total No. non-compliant test results	Commodity	No. of non-compliant test results		Country of origin
			no MRL	above MRL	
Iprodione	21	Apple		1	Australia
		Cucumber	2		Australia
		Lemon	3		Australia
		Parsley	5		Australia
		Peas	10		Australia (9), China (1)
Chlorpyrifos	12	Carrot		2	Australia
		Cucumber		3	Australia
		Parsley		2	Australia
		Spinach		5	Australia
Carbendazim	6	Apple		1	Australia
		Mango	1		Australia
		Plum	1		Australia
		Peas	3		Australia

Pyrimethanil	5	Celery	5		Australia (4), Unknown (1)
Dimethoate	4	Apple	2		Australia
		Spinach	1		Australia
		Tomato		1	Australia
Cypermethrin	2	Peas		2	Australia
Abamectin	1	Cucumber		1	Australia
Captan	1	Peas	1		Australia
Ethephon	1	Tomato		1	Australia
Fenvalerate	1	Parsley	1		Australia
Imidacloprid	1	Capsicum		1	Australia
Linuron	1	Parsley		1	Australia
Permethrin	1	Capsicum		1	Australia
Prochloraz	1	Mango		1	Australia
Tebuconazole	1	Peas		1	Australia
Trichlorfon	1	Capsicum		1	Australia

Table 6. Summary non-compliant chemical-food results – 2015

Chemical	Total No. non-compliant test results	Commodity	No. of non-compliant test results		Country of origin
			no MRL	above MRL	
Chlorpyrifos	11	Capsicum		1	Australia
		Choy		1	Australia
		Coriander	1		Australia
		Cucumber		5	Australia
		Spinach		3	Australia
Iprodione	5	Peas	5		Australia (3), China (2)
Cyprodinil	2	Apple		2	Australia
Triadimenol	2	Basil	2		Australia
Carbendazim	1	Peas	1		Australia
Dimethoate	1	Tomato		1	Australia
Ethephon	1	Tomato		1	Australia
Fenamiphos	1	Basil	1		Australia
Methomyl	1	Cucumber		1	Australia
Permethrin	1	Tomato		1	Australia
Trichlorfon	1	Basil	1		Australia

Table 7 lists the types of chemicals tested and the limits of reporting (LOR) for the tests conducted. See table 8 for the list of chemicals tested for each survey. Where the selection of chemicals were changed this was due to outcomes of reviews conducted on data of various residue monitoring programs.

Table 7. Summary of chemicals tested and LORs

Organophosphates	LOR (mg/kg)	Organochlorines	LOR (mg/kg)	Fungicides	LOR (mg/kg)	Carbamates	LOR (mg/kg)
Azinphos Methyl	0.01	Aldrin	0.01	Azoxystrobin	0.1	3 Hydroxy Carbofuran	0.05
Azinphos Ethyl	0.01	BHC-a	0.01	Captan	0.1	Carbaryl	0.05
Chlorfenvinphos (E)	0.01	BHC-b	0.01	Chlorothalonil	0.1	Carbendazim	0.05
Chlorfenvinphos (Z)	0.01	Chlordane-a	0.01	Cyproconazole	0.1	Carbofuran	0.05
Chlorpyrifos	0.01	Chlordane-g	0.01	Diphenylamine	0.5	Imidacloprid	0.05
Demeton-S-Methyl	0.01	Chlothal Dimethyl	0.01	Fenhexamid	0.5	Indoxacarb	0.2
Diazinon	0.01	DDD	0.01	Fludioxonil	0.01	Methiocarb	0.05
Dichlorvos	0.01	DDE	0.01	Flusilazole	0.1	Methomyl	0.05
Dimethoate	0.01	DDT	0.01	Hexaconazole	0.1	Oxamyl	0.05
Ethion	0.01	Dicofol	0.1	Imazalil	0.5	Pirimicarb	0.05
Fenamiphos	0.01	Dieldrin	0.01	Iprodione	0.01	Propoxur	0.05
Fenitrothion	0.01	Endosulfan Sulphate	0.01	Metalaxyl	0.01		
Fenthion	0.01	Endosulfan-a	0.01	Myclobutanil	0.1		
Malathion	0.01	Endosulfan-b	0.01	O-Phenylphenol	0.5		
Methamidophos	0.1	Endrin	0.01	Prochloraz	0.5		
Methidathion	0.01	Endrin Ketone	0.01	Propiconazole	0.1		
Mevinphos	0.01	Heptachlor	0.01	Pyrimethanil	0.01		
Omethoate	0.5	Heptachlor Epoxide	0.01	Quintozene	0.01		

Pyrethroids	LOR (mg/kg)	Herbicides	LOR (mg/kg)	Acaricides	LOR (mg/kg)	Insecticides	LOR (mg/kg)
Bifenthrin	0.1	Clethodim	0.1	Etoxazole	0.05	Abamectin	0.01
Bioresmethrin	0.1	Cyprodinil	0.01	Hexythiazox	0.5	Chlorfenapyr	0.5
Cyfluthrin	0.1	Ethephon	0.1	Propargite	0.1	Fipronil	0.1
Cyhalothrin	0.1	Linuron	0.05	Tebufenpyrad	0.05	Flubendiamide	0.01
Cypermethrin	0.1	Pendimethalin	0.05			Piperonyl Butoxide	0.01
Deltamethrin	0.1					Spinosad	0.01
Fenvelerate	0.1						
Fluvalinate	0.1						
Permethrin	0.1						
Procymidone	0.1						
Tetradifon	0.1						

Organophosphates	LOR (mg/kg)	Organochlorines	LOR (mg/kg)	Fungicides	LOR (mg/kg)
Parathion Ethyl	0.01	Hexachlorobenzene	0.01	Tebuconazole	0.1
Parathion Methyl	0.01	Lindane (gamma BHC)	0.01	Thiabendazole	0.05
Phorate	0.01	Methoxychlor	0.01	Triadimefon	0.1
Pirimiphos Ethyl	0.01	Oxychlordane	0.01	Triadimenol	0.05
Pirimiphos Methyl	0.01			Trifloxystrobin	0.5
Pyrazophos	0.01				
Trichlorfon	0.05				

Table 8. List of chemicals tested

2009		
3 Hydroxy Carbofuran	Diazinon	Metalaxyl
Aldrin	Dichlorvos	Methamidophos
Azinphos Methyl	Dicofol	Methidathion
BHC-a	Dieldrin	Methiocarb
BHC-b	Dimethoate	Methoxychlor
Bifenthrin	Endosulfan Sulphate	Mevinphos
Bioresmethin	Endosulfan-a	Myclobutanil
Captan	Endosulfan-b	Parathion Ethyl
Carbaryl	Endrin	Parathion Methyl
Carbendazim	Ethion	Pendimethalin
Carbofuran	Fenamiphos	Permethrin
Chlordane-a	Fenitrothion	Phorate
Chlordane-g	Fenthion	Piperonyl Butoxide
Chloropyrifos	Fenvelerate	Pirimicarb
Chlothal Dimethyl	Fipronil	procymidone
Cyfluthrin	Flusilazole	Propargite
Cyhalothrin	Fluvalinate	Propiconazole
Cypermethrin	Heptachlor	Propoxur
Cyproconazole	Heptachlor Epoxide	Pyazophos
DDD	Hexachlorobenzene	Quintozene
DDE	Hexaconazole	Tebuconazole
DDT	Iprodione	Tetradifon
Deltamethrin	Lindane	Triadimefon
Demeton-S-Methyl	Malathion	

2011		
3 Hydroxy Carbofuran	Diazinon	Malathion
Aldrin	Dichlorvos	Metalaxyl
Azinphos Methyl	Dicofol	Methamidophos
BHC-a	Dieldrin	Methidathion
BHC-b	Dimethoate	Methiocarb
Bifenthrin	Endosulfan Sulphate	Methoxychlor
Bioresmethrin	Endosulfan-a	Mevinphos
Captan	Endosulfan-b	Myclobutanil
Carbaryl	Endrin	Parathion Ethyl
Carbendazim	Ethion	Parathion Methyl
Carbofuran	Fenamiphos	Pendimethalin
Chlordane-a	Fenitrothion	Permethrin
Chlordane-g	Fenthion	Phorate
Chlorpyrifos	Fenvalerate	Piperonyl Butoxide
Chlorthal Dimethyl	Fipronil	Pirimicarb
Cyfluthrin	Flusilazole	Procymidone
Cyhalothrin	Fluvalinate	Propargite
Cypermethrin	Heptachlor	Propiconazole
Cyproconazole	Heptachlor Epoxide	Propoxur
DDD	Hexachlorobenzene	Pyrazophos
DDE	Hexaconazole	Quintozene
DDT	Imidacloprid	Tebuconazole
Deltamethrin	Iprodione	Tetradifon
Demeton-S-Methyl	Lindane	Triadimefon

2013		
3 Hydroxy Carbofuran	Ethephon	Pirimicarb
Abamectin	Ethion	Pirimiphos Ethyl
Aldrin	Etoxazole	Pirimiphos Methyl
Azinphos Ethyl	Fenamiphos	Prochloraz
Azinphos Methyl	Fenhexamid	Procymidone
Azoxystrobin	Fenitrothion	Propargite
BHC-a	Fenthion	Propiconazole
BHC-b	Fenvalerate	Propoxur
Bifenthrin	Fipronil	Pyrazophos
Bioresmethin	Flubendiamide	Pyrimethanil
Captan	Fludioxonil	Quintozene
Carbaryl	Flusilazole	Spinosad
Carbendazim	Fluvalinate	Tebuconazole
Carbofuran	Heptachlor	Tebufenpyrad
Chlordane-a	Heptachlor epoxide	Tetradifon
Chlordane-g	Hexachlorobenzene	Thiabendazole
Chlorfenapyr	Hexaconazole	Triadimefon
Chlorfenvinphos (E)	Hexythiazox	Triadimenol

2015	
3 Hydroxy Carbofuran	Imidacloprid
Abamectin	Indoxacarb
Azinphos Ethyl	Iprodione
Azinphos methyl	Linuron
Azoxystrobin	Malathion
Bifenthrin	Metalaxyl
Bioresmethin	Methamidophos
Captan	Methidathion
Carbaryl	Methiocarb
Carbendazim	Methomyl
Carbofuran	Mevinphos
Chlorfenapyr	Myclobutanil
Chlorfenvinphos (E)	Omethoate
Chlorfenvinphos (Z)	O-phenylphenol
Chlorothalonil	Oxamyl
Chlorpyrifos	Parathion Ethyl
Clethodim	Parathion Methyl
Cyfluthrin	Pendimethalin

Chlorfenvinphos (Z)	Imazalil	Triclorfon	Cyhalothrin	Permethrin
Chlorpyrifos	Imidacloprid	Trifloxystrobin	Cypermethrin	Phorate
Clethodim	Indoxacarb		Cyproconazole	Piperonyl Butoxide
Clorthal Dimethyl	Iprodione		Cyprodinil	Pirimicarb
Cyfluthrin	Lindane (gamma BHC)		Deltamethrin	Pirimiphos Ethyl
Cyhalothrin	Linuron		Demeton-S-methyl	Pirimiphos Methyl
Cypermethrin	Malathion		Diazinon	Prochloraz
Cyproconazole	Metalaxyl		Dichlorvos	Procymidone
Cyprodinil	Methamidophos		Dimethoate	Propargite
DDD	Methidathion		Diphenylamine	Propiconazole
DDE	Methiocarb		Ethephon	Propoxur
DDT	Methomyl		Ethion	Pyrazophos
Deltamethrin	Methoxychlor		Etoxazole	Pyrimethanil
Demeton-S-methyl	Mevinphos		Fenamiphos	Quintozene
Diazinon	Myclobutanil		Fenhexamid	Spinosad
Dichlorvos	Omethoate		Fenitrothion	Tebuconazole
Dicofol	O-phenylphenol		Fenthion	Tebufenpyrad
Dieldrin	Oxamyl		Fenvalerate	Tetradifon
Dimethoate	Oxychlordane		Fipronil	Thiabendazole
Diphenylamine	Parathion Ethyl		Flubendiamide	Triadimefon
Endosulfan sulfate	Parathion Methyl		Fludioxonil	Triadimenol
Endosulfan-a	Pendimethalin		Flusilazole	Trichlorfon
Endosulfan-b	Permethrin		Fluvalinate	Trifloxystrobin
Endrin	Phorate		Hexythiazox	
Endrin Ketone	Piperonyl Butoxide		Imazalil	

Table 9 lists the fruit and vegetables that were chosen for testing and the number of commodities that were analysed for each survey.

Table 9. Number of commodities tested

Commodity	2009	2011	2013	2015
Apple	25		27	23
Asparagus	8	21		
Banana	18	20		
Broccoli	14			
Cabbage	12			
Capsicum	24	40	20	20
Carrot			20	
Cauliflower	9			
Celery			21	
Cherry			20	
Choy (bok & pak choy)				20
Corn	8	20	20	
Cucumber			23	22
Garlic	15	20		
Grape			20	
Herbs				20

Kiwi			22	
Lemon			20	
Lettuce	18			
Lime			20	
Mandarin	13		20	
Mango			20	
Mushroom	11			
Nectarine	6		20	21
Onion	19			
Orange	19	20	21	
Parsley			19	
Passionfruit			19	
Peach	5			20
Pear	12			
Peas (snow & sugar snap)	24		21	22
Plum			20	24
Potato	7		20	
Spinach	9		20	20
Squash			21	
Strawberry	13	21	20	
Tomato	20	40	21	23

Other findings

The majority of fruit and vegetables sold at the retail level were sourced from wholesale central markets, where food safety risks were managed by an industry-based testing program. All fruit and vegetable wholesalers at the central markets had access to a horticultural residue testing program 'Fresh Test' which was provided by the Chamber of Fruit and Vegetable Industries Western Australia.

The supply chain of fresh fruit and vegetables from farm to retail sale was complex, making it difficult to verify the origin of a specific commodity. Retail outlets often sourced fruit and vegetables from multiple suppliers and, it was common practice to mix produce from different suppliers. Supplier details were maintained at the retail level, but these details often did not extend to including grower's details. Grower details were kept by the wholesale suppliers at the central markets. These findings indicate that a broader understanding of the supply chain from farm to retail sale is needed to strengthen traceability requirements. The findings also support plans by FSANZ to examine traceability requirements for all industry sectors and supply chains.[5]

Analytical testing for the survey work was comprehensive and at times, there were extended periods for reporting test results. The extended reporting periods added to the difficulty for verifying the origin of a specific commodity. Due to the nature of fresh fruit and vegetables, their seasonal availability and high turnover meant that at times, a specific commodity was no longer available when testing was completed. A review of the analytical testing timeframe will be needed to assist with the difficulties identified for traceability.

Conclusion

The majority of fruit and vegetables tested during surveys conducted in 2009, 2011, 2013 and 2015 were within the maximum residue limits. Overall, 90% of fruit and vegetables tested were compliant with the MRLs prescribed under the Food Standards Code. In total, the number of non-compliant samples was higher where samples were detected with a chemical residue that did not have a set MRL.

Non-compliant findings were notified to local government enforcement agencies indicating that further investigation was required.

Limitations in the ability to verify the origin of a fruit or vegetable purchased from retail sale were highlighted.

These findings will be used to inform future compliance work and to support FSANZ plans to consider a variation to Standard 1.4.2 of the Food Standards Code, to permit the sale of food with low levels of residues, where unexpected exposure to agvet chemicals has been determined and, to examine traceability requirements for all industry sectors.

Future activities

The Department of Health will undertake the following work:

1. Provide feedback to fruit and vegetable industries highlighting areas of non-compliance to improve on-farm practices.

2. Share evidence of non-compliance with state and Australian government authorities for consideration of future compliance programs and chemical review processes.

3. Share report findings with Australian government authorities to support FSANZ plans to consider a variation to Standard 1.4.2 of the Food Standards Code and to examine traceability requirements.

4. Strengthen interagency co-ordination for managing identified risks.

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