Generation of pesticide residue data in vegetables to support minor-use permits - Region 1

Martin Collett
Agrisearch Services Pty Ltd

Project Number: VG04071

VG04071

This report is published by Horticulture Australia Ltd to pass on information concerning horticultural research and development undertaken for the vegetables industry.

The research contained in this report was funded by Horticulture Australia Ltd with the financial support of the vegetable industry.

All expressions of opinion are not to be regarded as expressing the opinion of Horticulture Australia Ltd or any authority of the Australian Government.

The Company and the Australian Government accept no responsibility for any of the opinions or the accuracy of the information contained in this report and readers should rely upon their own enquiries in making decisions concerning their own interests.

ISBN 0 7341 1694 2

Published and distributed by:

Horticultural Australia Ltd

Level 7
179 Elizabeth Street
Sydney NSW 2000
Telephone: (02) 8295 2300
Fax: (02) 8295 2399

E-Mail: horticulture@horticulture.com.au

Know-how for Horticulture™

Agrisearch

DIRECTORS M.G. Collett, B.Sc.Agr., M.Sc., C.P.Ag.
L.W. Mitchell, B.Agr.Sc.(Hons.), C.P.Ag.
D.R. Litzow, B.Agr.Sc., C.P.Ag.
I.S. Ridley, B.Rur.Sc.
M.R. Lamond, B.Bus.(Agric.), ADFM

Agrisearch Services Pty Ltd
ABN 85 109 240 333
50 Leewood Drive
PO Box 972
Orange NSW 2800
Australia
E-mail: agrisearch@agrisearch.com.au
Web: www.agrisearch.com.au
Telephone: (02) 6362 4539
Facsimile: (02) 6362 7844

GENERATION OF PESTICIDE RESIDUES IN VEGETABLES TO SUPPORT MINOR USE PERMITS.

STUDIES CONDUCTED BY AGRISEARCH SERVICES PTY LTD, AUSTRALIA, 2005-2007.

Submitted to:	Horticulture Australia Limited Level 7, 179 Elizabeth Street Sydney NSW 2000
Client Contact:	Brad Wells
Submitted by:	Agrisearch Services Pty Ltd 50 Leewood Drive Orange NSW 2800
Project Leader:	Martin Collett
Client Reference:	VG04071
Reference Project:	HAL/GLP/04/03, Studies 1-11
Report Number:	HAL/VG04071
Date Submitted:	14 February 2008

- CONTENTS -

Page Number

1. MEDIA SUMMARY

In Australia, before an agrochemical product can be sold or used, it first must be registered by the Australian Pesticides and Veterinary Medicines Authority (APVMA). In order for a manufacturer to register a product they are required to submit a comprehensive data package to the APVMA. The costs for generating and collating such data are high and unfortunately many vegetable crops are too small individually for agrochemical manufacturers to bear the high cost of registering products for use in those crops. As a result, vegetable growers are often placed in situations where they risk severe crop losses from insects, weeds and diseases because appropriate pesticides are not available. On the other hand, they risk buyers rejecting their produce and other penalties if they are detected using products that are not registered for that specific use.

The APVMA's National Permit System adds some flexibility to the lengthy registration process and legalises the availability of products for minor-use purposes, not specified on the product label. However, off-label permits issued by the APVMA still must be applied for along with information and data submitted that verifies that the permitted use will be effective and will not have any harmful effects on humans, the crops or the environment.

In this project, 11 studies were conducted on 21 different pesticides including fungicides, herbicides, insecticides and miticides. These studies were conducted at 30 different field sites in New South Wales, Queensland, Victoria and South Australia and included crops such as; greenhouse grown capsicums, field grown chillies, horseradish, brassica leafy vegetables, lettuce, silverbeet, spring onions, celeriac, celery, snow peas and sugar snap peas.

The studies involved one or multiple applications of the pesticides on the target crops, sampling the crops at or around the normal commercial harvest time, and then analysing the sampled plant parts for residues of the target pesticide. Detailed study reports on the field and analytical components were prepared and these were used as part of the permit applications to the APVMA.

The major outcome of this project is that pesticides that could not be legally used by vegetable growers will now be available. This project has been part of a larger programme of research that has been conducted over the past few years. Although the outcomes of this project have been met there is an ongoing need for growers to have access to newer and better pesticides and so similar projects should be planned and conducted in the future.

2. TECHNICAL SUMMARY

Eleven studies were conducted to determine the tissue residue profile of 21 different pesticides including fungicides, herbicides, insecticides and miticides. These studies were conducted at 30 different field sites in New South Wales, Queensland, Victoria and South Australia and included crops such as; greenhouse grown capsicums, field grown chillies, horseradish, brassica leafy vegetables, lettuce, silverbeet, spring onions, celeriac, celery, snow peas and sugar snap peas. The study co-ordination was conducted by Agrisearch Services Pty Ltd at Orange, New South Wales and the analytical component was conducted at Agrisearch Analytical Pty Ltd at Rozelle, New South Wales. The studies were conducted under the OECD Principles of Good Laboratory Practice (GLP).

The test substances and their active ingredients were as follow;

NIMROD SYSTEMIC FUNGICIDE - 250 g/L bupirimate
BAYFIDAN 250 EC FUNGICIDE - 250 g/L triadimenol
VERTIMEC MITICIDE/INSECTICIDE - 18 g/L abamectin
CONFIDOR 200 SC INSECTICIDE - 200 g/L imidacloprid
ROVRAL AQUAFLO FUNGICIDE - 500 g/L iprodione
LANNATE-L INSECTICIDE - 225 g/L methomyl
AMISTAR WG FUNGICIDE - 500 g/kg azoxystrobin
RIDOMIL GOLD MZ SYSTEMIC AND PROTECTIVE FUNGICIDE - 640 g/kg mancozeb and 40 g/kg metalaxyl-m
DITHANE RAINSHIELD FUNGICIDE - 750 g/kg mancozeb
ZINEB FUNGICIDE - 800 g/kg zineb
NUFARM FASTAC DUO INSECTICIDE - 100 g/L alpha-cypermethrin
KARATE WITH ZEON TECHNOLOGY INSECTICIDE - 250 g/L lambda-cyhalothrin
TILT 250 EC SYSTEMIC FUNGICIDE - 250 g/L propiconazole
SUCCESS NATURALYTE INSECT CONTROL - 120 g/L spinosad
PIRIMOR WG APHICIDE - 500 g/kg pirimicarb
APPLAUD INSECTICIDE - 400 g/L buprofezin
DUPONT AVATAR INSECTICIDE - 400 g/kg indoxacarb
BASAGRAN POST-EMERGENCE HERBICIDE - 480 g/L bentazone
FOLICUR 430 SC FUNGICIDE - 430 g/L tebuconazole
CONFIDOR 200 SC INSECTICIDE - 200 g/L imidacloprid
BLADEX 900 WG HERBICIDE - 900 g/kg cyanazine

The studies conducted were as follows;

Bupirimate and triadimenol in greenhouse grown capsicums - AVG1166, AVG136
Abamectin, imidacloprid and iprodione in chillies and paprika - AVG1163, AVG1137, AVG1135
Bupirimate, triadimenol and methomyl in chillies and paprika - AVG1136, AVG1134, AVG1119
Azoxystrobin, metalaxyl-m, and mancozeb in horseradish - AVG1089, AVG1088
Zineb and iprodione in brassica leafy vegetables - AVG1047, AVG1122
Abamectin, tebuconazole and alpha-cypermethrin in lettuce - AVG1124, AVG47, AVG1108
Lambda-cyhalothrin, metalaxyl-M + mancozeb and propiconazole in silver beet -AVG117, AVG777, AVG772
Benalaxyl + mancozeb and spinosad in spring onions - AVG74 and AVG1171
Pirimicarb, iprodione and methomyl in celeriac - AVG1140, AVG1144 and AVG1142
Alpha-cypermethrin, buprofezin, indoxacarb, metalaxyl-M + mancozeb, and propiconazole in celery - AVG1107, AVG191, AVG1158, AVG846 and AVG158
Bentazone, tebuconazole, imidacloprid, indoxacarb and cyanazine in snow peas and sugar snap peas - AVG1114, AVG1112, AVG1126, AVG1095 and AVG1115

Field sites were selected at locations where the nominated crop was commonly grown. Specific site details and requirements were as per the approved Study Plan and the Standard Operating Procedures (SOPs) of Agrisearch Services Pty Ltd. More than one study may have been conducted at a particular site, as detailed in the specific Study Plan. Treatment application timing and sampling was according to Good Agricultural Practice and locally accepted procedures.

Each trial within a study was established using an unrandomised and unreplicated large block design.

The pesticide treatments were applied in a manner, which simulated best commercial practice for the application of herbicides, fungicides, insecticides and miticides to the target crops. The method used replicated how the co-operator farmer typically grows and sprays the crop.

Sampling was carried out according to documented Standard Operating Procedures relevant to crop and plant portion to be sampled and analysed.

Plant samples that were collected from each field site were sent frozen to Agrisearch Analytical Pty Ltd and the samples were analysed as per the Study Plan with the laboratory report sent to the Study Director for inclusion in a composite Study Report for each of the eleven studies.

The data generated from the studies have been included or will be included in submissions to the Australian Pesticides and Veterinary Medicines Authority. These submissions are for permit applications, pesticide label extensions or for inclusion in complete pesticide registration applications.

3. INTRODUCTION

Eleven studies were conducted to determine the tissue residue profile of 21 different pesticides including fungicides, herbicides, insecticides and miticides. These studies were conducted at 30 different field sites in New South Wales, Queensland, Victoria and South Australia and included crops such as; greenhouse grown capsicums, field grown chillies, horseradish, brassica leafy vegetables, lettuce, silverbeet, spring onions, celeriac, celery, snow peas and sugar snap peas. The study co-ordination was conducted by Agrisearch Services Pty Ltd at Orange, New South Wales and the analytical component was conducted at Agrisearch Analytical Pty Ltd at Rozelle, New South Wales. The study was conducted under the OECD Principles of Good Laboratory Practice (GLP).

This report contains the experimental methods used and presents the results obtained.

The trial was conducted under Horticulture Australia Limited project VG04071 Agrisearch Project HAL/GLP/04/03.

4. MATERIALS AND METHODS

4.1 Individual Study Details

Eleven studies were conducted according to approved Study Plans that had been prepared as per the OECD GLP Guidelines. Each Study Plan number and title and summary details of the individual studies were as follows:

HAL/GLP/04/03-1; Residues of bupirimate and triadimenol in greenhouse grown capsicums after applications of NIMROD SYSTEMIC FUNGICIDE and BAYFIDAN 250 EC FUNGICIDE – Studies AVG1166 and AVG136 – Two sites; Adelaide region South Australia, Melbourne region Victoria.

HAL/GLP/04/03-2; Residues of abamectin, imidacloprid and iprodione in chillies and paprika after applications of VERTIMEC MITICIDE/INSECTICIDE, CONFIDOR 200 SC INSECTICIDE and ROVRAL AQUAFLO FUNGICIDE – Studies AVG1163, AVG1137 and AVG1135 – Two sites; Bundaberg region Queensland, Gosford region NSW.

HAL/GLP/04/03-3; Residues of bupirimate, triadimenol and methomyl in chillies and paprika after applications of NIMROD SYSTEMIC FUNGICIDE, BAYFIDAN 250 EC FUNGICIDE and LANNATE-L INSECTICIDE – Studies AVG1136, AVG1134 and AVG1119 – Two sites; Bundaberg region Queensland, Gosford region NSW.

HAL/GLP/04/03-4; Residues of azoxystrobin, metalaxyl-m, and mancozeb in horseradish after applications of AMISTAR WG FUNGICIDE, RIDOMIL GOLD MZ WG SYSTEMIC AND PROTECTIVE FUNGICIDE, and DITHANE M-45 AGRICULTURAL FUNGICIDE – Studies AVG1089 and AVG1088 – Two sites; Adelaide region South Australia, Melbourne region Victoria.

HAL/GLP/04/03-5; Residues of zineb and iprodione in brassica leafy vegetables after applications of ZINEB FUNGICIDE and ROVRAL AQUAFLO FUNGICIDE – Studies AVG1047 and AVG1122 – Four sites; Adelaide region South Australia, Melbourne region Victoria, Gatton region Queensland, Gosford region NSW.

HAL/GLP/04/03-6; Residues of abamectin, tebuconazole and alpha-cypermethrin in lettuce after applications of VERTIMEC MITICIDE/INSECTICIDE, FOLICUR 430 SC FUNGICIDE and FASTAC DUO INSECTICIDE – Studies AVG1124, AVG47 and AVG1108 – Four sites; Adelaide region South Australia, Melbourne region Victoria, Gatton region Queensland, Gosford region NSW.

HAL/GLP/04/03-7; Residues of lambda-cyhalothrin, metalaxyl-M + mancozeb and propiconazole in silver beet after applications of KARATE WITH ZEON TECHNOLOGY INSECTICIDE, RIDOMIL GOLD MZ WG SYSTEMIC AND PROTECTIVE FUNGICIDE and TILT 250 EC SYSTEMIC FUNGICIDE – Studies AVG117, AVG777 and AVG772 – Two sites; Adelaide region South Australia, Gosford region NSW.

HAL/GLP/04/03-8; Residues of benalaxyl + mancozeb and spinosad in spring onions after applications of GALBEN M SYSTEMIC FUNGICIDE and SUCCESS NATURALYTE INSECT CONTROL – Studies AVG74 and AVG1171 – Four sites; Adelaide region South Australia, Melbourne region Victoria, Gatton region Queensland, Gosford region NSW.

HAL/GLP/04/03-9; Residues of pirimicarb, iprodione and methomyl in celeriac after applications of PIRIMOR WG APHICIDE, ROVRAL AQUAFLO FUNGICIDE and LANNATE-L INSECTICIDE – Studies AVG1140, AVG1144 and AVG1142 – Two sites; Adelaide region South Australia, Gatton region Queensland.

HAL/GLP/04/03-10; Residues of alpha-cypermethrin, buprofezin, indoxacarb, metalaxyl-M + mancozeb, and propiconazole in celery after applications of FASTAC DUO INSECTICIDE, APPLAUD INSECTICIDE, DUPONT AVATAR INSECTICIDE, RIDOMIL GOLD MZ WG SYSTEMIC AND PROTECTIVE FUNGICIDE and TILT 250 EC SYSTEMIC FUNGICIDE – Studies AVG1107, AVG191, AVG1158, AVG846 and AVG158 – Two sites; Adelaide region South Australia, Gosford region NSW.

HAL/GLP/04/03-11; Residues of bentazone, tebuconazole, imidacloprid, indoxacarb and cyanazine in snow peas and sugar snap peas after applications of BASF BASAGRAN POST-EMERGENCE HERBICIDE, FOLICUR 430 SC FUNGICIDE, CONFIDOR 200 SC INSECTICIDE, DUPONT AVATAR INSECTICIDE and BLADEX 900 WG HERBICIDE – Studies AVG1114, AVG1112, AVG1126, AVG1095 and AVG1115 – Four sites; Adelaide region South Australia, Melbourne region Victoria, Bundaberg region Queensland, Gosford region NSW.

4.2 Trial Sites

Field sites were selected at locations where the nominated crop was commonly grown. Specific site details and requirements were as per the approved Study Plan and the Standard Operating Procedures (SOPs) of Agrisearch Services Pty Ltd. More than one study may have been conducted at a particular site, as detailed in the specific Study Plan. Treatment application timing and sampling was according to Good Agricultural Practice and locally accepted procedures.

4.3 Trial Design

Each trial within a study was established using an unrandomised and unreplicated large block design. The individual plot sizes generally ranged between 10-20 m^2 in area. Larger plot sizes were used if it was deemed necessary to obtain the required sample sizes. Each plot size was sufficient to produce duplicate, fresh-weight samples of produce on multiple occasions after the last application of each treatment, in sufficient quantity and number to satisfy international sampling requirements.

The untreated plots were situated as up-slope and as up-wind from each treated plot as practical, to prevent contamination of the untreated plot. Each plot was marked to completely and uniquely identify it by its geometry, trial number and treatment number. Test plots were considered as restricted access areas with measures taken to exclude unauthorised persons from the test area.

4.4 Formulations

The pesticide formulations used in the studies were as follows:

NIMROD SYSTEMIC FUNGICIDE - an emulsifiable concentrate formulation containing 250 g/L bupirimate as the active constituent. The sample was supplied by Makhteshim-Agan (Aust) Pty Ltd.

BAYFIDAN 250 EC FUNGICIDE - an emulsifiable concentrate formulation containing 250 g/L triadimenol as the active constituent. The sample was supplied by Bayer CropScience Pty Ltd.

VERTIMEC MITICIDE/INSECTICIDE - an emulsifiable concentrate formulation containing 18 g/L abamectin as supplied by Syngenta Crop Protection.

CONFIDOR 200 SC INSECTICIDE - a suspension concentrate formulation containing 200 g/L imidacloprid as supplied by Bayer CropScience.

ROVRAL AQUAFLO FUNGICIDE - a suspension concentrate formulation containing 500 g/L iprodione supplied by Bayer CropScience.

LANNATE-L INSECTICIDE - a soluble concentrate formulation containing 225 g/L methomyl as the active constituent as manufactured and supplied by Crop Care Australasia Pty Ltd.

AMISTAR WG FUNGICIDE - a water dispersible granule formulation containing 500 g/kg azoxystrobin as the active constituent as manufactured and supplied by Syngenta Crop Protection Inc.

RIDOMIL GOLD MZ SYSTEMIC AND PROTECTIVE FUNGICIDE - a water dispersible granule formulation containing 640 g/kg mancozeb and 40 g/kg metalaxyl-m as the active constituent as manufactured and supplied by Syngenta Crop Protection Inc.

DITHANE RAINSHIELD FUNGICIDE - a water dispersible granule formulation containing 750 g/kg mancozeb as the active constituent as manufactured and supplied by Dow AgroSciences Australia Limited.

ZINEB FUNGICIDE - a wettable powder formulation containing 800 g/kg zineb as supplied by Barmac Industries.

NUFARM FASTAC DUO INSECTICIDE - an emulsifiable concentrate formulation containing 100 g/L alpha-cypermethrin as manufactured and supplied by Nufarm Australia Ltd.

KARATE WITH ZEON TECHNOLOGY INSECTICIDE - a suspension concentrate formulation containing 250 g/L lambda-cyhalothrin as the active constituent as manufactured and supplied by Syngenta Crop Protection Pty Ltd.

TILT 250 EC SYSTEMIC FUNGICIDE - an emulsifiable concentrate formulation containing 250 g/L propiconazole as the active constituent as manufactured and supplied by Syngenta Crop Protection Pty Ltd.

SUCCESS NATURALYTE INSECT CONTROL - a suspension concentrate formulation containing 120 g/L spinosad as the active constituent as manufactured and supplied by Dow AgroSciences (NZ) Limited.

PIRIMOR WG APHICIDE - a water dispersible granule formulation containing 500 g/kg pirimicarb as the active constituent as marketed by Syngenta Crop Protection Pty Limited.

APPLAUD INSECTICIDE - a suspension concentrate formulation containing 400 g/L buprofezin as the active constituent as manufactured and supplied by Dow AgroSciences Australia Limited.

DUPONT AVATAR INSECTICIDE - a water dispersible granule formulation containing 400 g/kg indoxacarb as the active constituent as manufactured and supplied by DuPont Australia Limited.

BASAGRAN POST-EMERGENCE HERBICIDE - a soluble liquid formulation containing 480 g/L bentazone as the active constituent as marketed by Crop Care Australasia Pty Ltd Limited.

FOLICUR 430 SC FUNGICIDE - a suspension concentrate formulation containing 430 g/L tebuconazole as the active constituent as manufactured and supplied by Bayer CropScience Pty Ltd.

CONFIDOR 200 SC INSECTICIDE - a suspension concentrate formulation containing 200 g/L imidacloprid as the active constituent as manufactured and supplied by Bayer CropScience Pty Ltd.

BLADEX 900 WG HERBICIDE - a water dispersible granule formulation containing 900 g/kg cyanazine as the active constituents as distributed by Agnova Australia Limited.

4.5 Treatment Method

The pesticide treatments were applied in a manner, which simulated best commercial practice for the application of herbicides, fungicides, insecticides and miticides to the target crops. The method used replicated how the co-operator farmer typically grows and sprays the crop.

Pre-harvest foliar treatments were generally applied on a dilute basis spraying all parts of the plant foliage to just before the point of run-off using a motorised pump, hose and hand gun or lance or a pressurised tank, hose and hand gun or lance. A horizontal or vertical boom may have been used. The inter-rows were not sprayed unless this was the typical method. Droppers may have been use to improve the coverage of the underside of leaves.

The total spray volume was typically a maximum of 1000 L/ha depending on plant size and growing density. Full application details were recorded in the individual study reports.

4.6 Sampling Procedures

Sampling was carried out according to documented Standard Operating Procedures relevant to crop and plant portion to be sampled and analysed. In general, plant portions were collected from 12 locations or plants within each plot for each sample taken. The end plants of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

The Primary Samples were the samples that were sent to the laboratory for analysis. The Reserve Samples remain in the freezer for at least 12 months after the completion of each study after which time they are discarded.

4.7 Analysis of Samples

Plant samples that were collected from each field site were sent frozen to the nominated analytical laboratory, Agrisearch Analytical Pty Ltd, as per the Study Plan. The samples were analysed as per the Study Plan with the laboratory report sent to the Study Director for inclusion in a composite Study Report for each of the eleven studies.

5. RESULTS AND DISCUSSION

Summaries of the eleven studies, including results and discussions, are presented below.

5.1 HAL/GLP/04/03-1; Residues of bupirimate and triadimenol in greenhouse grown capsicums after applications of NIMROD SYSTEMIC FUNGICIDE and BAYFIDAN 250 EC FUNGICIDE – Studies AVG1166 and AVG136

This study was conducted to determine the tissue residue profile of bupirimate and triadimenol in greenhouse hydroponic grown capsicums after applications of NIMROD SYSTEMIC FUNGICIDE and BAYFIDAN 250 EC FUNGICIDE. The study consisted of two field sites; Virginia South Australia and Munno Para West South Australia. The study co-ordination was conducted by Agrisearch Services Pty Ltd at Orange, New South Wales and the analytical component was conducted at Agrisearch Analytical Pty Ltd at Rozelle, New South Wales. The study was conducted under the OECD Principles of Good Laboratory Practice (GLP).

The test substance was as follows:

NIMROD SYSTEMIC FUNGICIDE - an emulsifiable concentrate formulation containing 250 g/L bupirimate as the active constituent. The sample was supplied by Makhteshim-Agan (Aust) Pty Ltd.

BAYFIDAN 250 EC FUNGICIDE - an emulsifiable concentrate formulation containing 250 g/L triadimenol as the active constituent. The sample was supplied by Bayer CropScience Pty Ltd.

An un-replicated randomised single plot design was used at each test site.

The treatments and sampling times for Trial 5109, Virginia South Australia, are presented in the table below:

Number	Treatment	Rate Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1.	Untreated control			0
2.	NIMROD	60 (62) mL/100 L	7, 0	0, 1, 5
3.	BAYFIDAN	40 (39) mL/100 L	9, 5, 0	0, 1, 5

*Averaged over all applications
DBFS - days before first sampling
DALA - days after last application

The treatments and sampling times for Trial 5110, Munno Para West, South Australia, are presented in the table below:

Number	Treatment	Rate Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1.	Untreated control			0
2.	NIMROD	60 (59) mL/100 L	7, 0	0, 1, 5
3.	BAYFIDAN	40 (39) mL/100 L	10, 5, 0	0, 1, 5

*Averaged over all applications
DBFS - days before first sampling
DALA - days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of fungicides in hydroponic grown capsicums. Treatments were applied by vertical boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 12 fruit and at least 2 kilograms of fruit were sampled from 12 individual plants of each treatment for each sample. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Bupirimate and triadimenol residues were determined according to methods developed by Agrisearch Analytical:

"Determination of Multi-Residues in Fruit and Vegetables using DSPE", AATM-S-60, Revision 5, Agrisearch Analytical Pty Ltd, 20 February 2006.

Most of the treated samples of hydroponic grown capsicums were found to contain residues of bupirimate at quantifiable levels (>0.05 mg/kg) after two applications of NIMROD SYSTEMIC FUNGICIDE made 7 days apart. Residues of bupirimate ranged from 0.07-0.09 mg/kg at 1 DAT 2 to <LOD-0.04 mg/kg at 5 DAT 2.

Most of the treated samples of hydroponic grown capsicums were found to contain residues of triadimenol at quantifiable levels (>0.05 mg/kg) after three applications of BAYFIDAN 250 EC FUNGICIDE made 4-5 days apart. In the trial conducted at Munno Para West, residues of triadimenol in the untreated samples were similar to those in the treated samples. The Reserve samples from this site were analysed with similar results to the primary samples found. It is not known where the source of the contamination of the untreated samples occurred. Residues of triadimenol ranged from 0.10-0.17 mg/kg at 1 DAT 3 to 0.05-0.15 mg/kg at 5 DAT 2.

5.2 HAL/GLP/04/03-2; Residues of abamectin, imidacloprid and iprodione in chillies and paprika after applications of VERTIMEC MITICIDE/INSECTICIDE, CONFIDOR 200 SC INSECTICIDE and ROVRAL AQUAFLO FUNGICIDE – Studies AVG1163, AVG1137 and AVG1135

A study was conducted from August 2005 to October 2007 to determine the tissue residue profile of abamectin, imidacloprid and iprodione when applied to chillies and paprika. The field component was conducted at field sites at Alloway, Queensland and Luddenham, New South Wales**.** The analytical component was conducted by Agrisearch Analytical Pty Ltd.

The test substances were as follows;

VERTIMEC MITICIDE/INSECTICIDE - an emulsifiable concentrate formulation containing 18 g/L abamectin as supplied by Syngenta Crop Protection.

CONFIDOR 200 SC INSECTICIDE - a suspension concentrate formulation containing 200 g/L imidacloprid as supplied by Bayer CropScience.

ROVRAL AQUAFLO FUNGICIDE - a suspension concentrate formulation containing 500 g/L iprodione supplied by Bayer CropScience.

An unreplicated large plot design was used at each test site.

The treatment sampling groups for Site 1, Alloway, Queensland are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	VERTIMEC	450 (459) mL/ha	28 & 0	0, 3 & 7
3	CONFIDOR	300 (314) mL/ha	0	0, 7 & 10
4	ROVRAL	1.0 (1.045) L/ha	14 & 0	0, 7 & 10

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 2, Luddenham, NSW are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	VERTIMEC	450 (450) mL/ha	28 & 0	0, 3 & 7
3	CONFIDOR	300 (300) mL/ha	0	0, 7 & 10
4	ROVRAL	1.0 (1.0) L/ha	14 & 0	0, 7 & 10

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of insecticides and fungicides to field grown chillies and paprika. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 24 fruit weighing at least 2 kg were sampled from 12 individual plants of each treatment for each sample. The end plants of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Abamectin and iprodione residues were determined according to methods developed by Agrisearch Analytical:

Abamectin - “Determination of Abamectin in Plant Materials and Processed Fractions", AATM-R-11, Agrisearch Analytical Pty Ltd, Rev 3 October 03.

Iprodione - “Determination of Multi-Residues in Fruit and Vegetables using DSPE”, AATM-S-60, Revision 5, Agrisearch Analytical Pty Ltd, 20 February 2006.

Imidacloprid residues were determined according to the following analytical method supplied by Bayer Australia Limited:

"Method of determining imidacloprid residues in plant materials", F.J.Placke and E.Weber, Pfanzenschutz-Nachrichten Bayer 46/1993.

The efficiency of the methods in the test facility was monitored by the analysis of control (untreated) samples and control (recovery) samples fortified with abamectin, iprodione and imidacloprid and analysed concurrently with the test samples. The average results of recovery assays were:

Fortification Level (mg/kg)	Recovery (%) ± RSD (%)		
	Abamectin	Iprodione	Imidacloprid
0.01	79±6	-	-
0.05	-	68±3	75±7

None of the treated chillies samples collected 0, 3 and 7 days after the second of two applications of VERTIMEC MITICIDE/INSECTICIDE applied 28 days apart were found to contain quantifiable residues of abamectin (>0.01 mg/kg).

None of the treated chillies samples collected 0, 7 and 10 days after a single application of CONFIDOR 200 SC INSECTICIDE were found to contain quantifiable residues of imidacloprid (>0.05 mg/kg).

Residues of iprodione greater than the limit of quantitation (0.05 mg/kg) were found in all of the treated samples after two applications of ROVRAL AQUAFLO FUNGICIDE applied 14 days apart. Residues of iprodione were a maximum of 0.59 mg/kg at 0 DAT2 and 0.45 mg/kg at 10 DAT2.

5.3 HAL/GLP/04/03-3; Residues of bupirimate, triadimenol and methomyl in chillies and paprika after applications of NIMROD SYSTEMIC FUNGICIDE, BAYFIDAN 250 EC FUNGICIDE and LANNATE-L INSECTICIDE – Studies AVG1136, AVG1134 and AVG1119

The field component of this study was conducted from May 2006 to June 2006 to determine the tissue residue profile of bupirimate, triadimenol and methomyl when applied to chillies. The study consisted of two field sites at Bundaberg, Queensland and Horsley Park, New South Wales**.**

The test substances were as follows;

NIMROD SYSTEMIC FUNGICIDE - an emulsifiable concentrate formulation containing 250 g/L bupirimate as the active constituent as manufactured and supplied by Makhteshim-Agan (Aust) Pty Ltd.

BAYFIDAN 250 EC FUNGICIDE – an emulsifiable concentrate formulation containing 250 g/L triadimenol as the active constituent as manufactured and supplied by Bayer CropScience Pty Ltd.

LANNATE-L INSECTICIDE – a soluble concentrate formulation containing 225 g/L methomyl as the active constituent as manufactured and supplied by Crop Care Australasia Pty Ltd.

An unreplicated large plot design was used at each test site.

The treatment sampling groups for Site 1, Bundaberg, Qld are presented in the table below:

Number	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	NIMROD	60 mL/100 L	8 & 0	0, 1 & 5
3	BAYFIDAN 250 EC	400 (411) mL/ha	11, 6 & 0	0, 1 & 5
4	LANNATE L	2.0 (2.1) L/ha	11, 6 & 0	0, 1 & 5

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 2, Horsley Park, NSW are presented in the table below:

Number	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	NIMROD	60 mL/100 L	7 & 0	0, 1 & 5
3	BAYFIDAN 250 EC	400 (407) mL/ha	10, 5 & 0	0, 1 & 5
4	LANNATE L	2.0 (2.0) L/ha	10, 5 & 0	0, 1 & 5

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of fungicides and insecticides to field grown chillies. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 24 fruit were sampled from 12 individual chilli plants of each treatment for each sample. The end plants of each plot were not sampled. The fruit was taken from all parts of the plants. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Bupirimate, triadimenol and methomyl residues were determined according to a published multi-pesticide residue analytical method:

"Validation of a Fast and Easy Method for the Determination of Residues from 229 Pesticides in Fruits and Vegetables Using Gas and Liquid Chromatography and Mass Spectrometric Detection", Lehotay et al, Journal of AOAC International Vol. 88, No. 2, 2005.

The efficiency of the method in the test facility was monitored by the analysis of control (untreated) samples and control (recovery) samples fortified with bupirimate, triadimenol and methomyl and analysed concurrently with the test samples. The average results of recovery assays were:

Fortification Level (mg/kg)	Recovery (%) ± RSD (%)			
	Bupirimate	Triadimenol	Methomyl	Methomyl Oxime
0.05	66±4	83±12	104±17	94±6

Residues of bupirimate, triadimenol and methomyl greater than the limit of detection (0.01 mg/kg) were found in all of the treated samples of chillies.

Bupirimate/NIMROD;
Residues of bupirimate in chillies were below the limit of quantitation 5 days after 2 applications of NIMROD applied at 7 day intervals.

Triadimenol/BAYFIDAN 250 EC;
Residues of triadimenol in chillies were a maximum of 0.07 mg/kg 5 days after 3 applications of BAYFIDAN 250 EC applied at 5 to 6 day intervals.

Methomyl/LANNATE L;
Residues of methomyl in chillies were a maximum of 0.57 mg/kg 5 days after 3 applications of LANNATE L applied at 5 to 6 day intervals.

5.4 HAL/GLP/04/03-4; Residues of azoxystrobin, metalaxyl-m, and mancozeb in horseradish after applications of AMISTAR WG FUNGICIDE, RIDOMIL GOLD MZ WG SYSTEMIC AND PROTECTIVE FUNGICIDE, and DITHANE M-45 AGRICULTURAL FUNGICIDE – Studies AVG1089 and AVG1088

A study was conducted from August 2005 to April 2007 to determine the tissue residue profile of azoxystrobin, metalaxyl-m and mancozeb when applied to horseradish. The field component was conducted at field sites at Langhorne Creek, South Australia and Pearcedale, Victoria**.** The analytical component was conducted by Agrisearch Analytical Pty Ltd.

The test substances were as follows;

AMISTAR WG FUNGICIDE - a water dispersible granule formulation containing 500 g/kg azoxystrobin as the active constituent as manufactured and supplied by Syngenta Crop Protection Inc.

RIDOMIL GOLD MZ SYSTEMIC AND PROTECTIVE FUNGICIDE – a water dispersible granule formulation containing 640 g/kg mancozeb and 40 g/kg metalaxyl-m as the active constituent as manufactured and supplied by Syngenta Crop Protection Inc.

DITHANE RAINSHIELD FUNGICIDE – a water dispersible granule formulation containing 750 g/kg mancozeb as the active constituent as manufactured and supplied by Dow AgroSciences Australia Limited.

An unreplicated large plot design was used at each test site.

The treatment sampling groups for Site 1, Langhorne Creek, SA are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	AMISTAR WG	300 (301) g/ha	14, 7 & 0	0, 1 & 5
3	RIDOMIL GOLD MZ WG + DITHANE RAINSHIELD	2500 (2488) g/ha + 200 (191) g/ha	7 & 0	0, 7 & 14

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 2, Pearcedale, Vic are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	AMISTAR WG	300 (304) g/ha	13, 6 & 0	0, 2 & 6
3	RIDOMIL GOLD MZ WG + DITHANE RAINSHIELD	2500 (2538) g/ha + 200 (195) g/ha	6 & 0	0, 7 & 14

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of fungicides to field grown horseradish. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 12 roots weighing at least 2 kg were sampled from 12 individual horseradish plants of each treatment for each sample. The end plants of each plot were not sampled. The roots were brushed to remove soil and the tops cut and discarded. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Azoxystrobin and metalaxyl-m residues were determined according to a method developed by Agrisearch Analytical:

"Determination of Multi-Residues in Fruit and Vegetables using DSPE", AATM-S-60, Revision 5, Agrisearch Analytical Pty Ltd, 20 February 2006.

The efficiency of the method in the test facility was monitored by the analysis of control (untreated) samples and control (recovery) samples fortified with azoxystrobin and bupirimate and analysed concurrently with the test samples. The average results of recovery assays were:

Fortification Level (mg/kg)	Recovery (%) ± RSD (%)	
	Azoxystrobin	Metalaxyl
0.05	81±15	88±9

Residues of azoxystrobin greater than the limit of detection (0.01 mg/kg) were found in most of the treated samples of horseradish. Residues of metalaxyl greater than the limit of detection (0.01 mg/kg) were not found in any of the treated samples of horseradish.

Azoxystrobin/AMISTAR WG;
Residues of azoxystrobin in horseradish were a maximum of 0.99 mg/kg 5 days after 3 applications of AMISTAR WG applied at 6 to 7 day intervals.

Metalaxyl-m/RIDOMIL GOLD MZ WG;
Residues of metalaxyl-m in horseradish were less than the limit of detection 0 days after 2 applications of RIDOMIL GOLD MZ WG applied at 6 to 7 day intervals.

Residues of mancozeb were unable to be determined due to high levels of naturally occurring carbon disulfide (CS_2) found in the controls, making the determination of mancozeb (as CS_2) in horseradish samples impractical.

5.5 HAL/GLP/04/03-5; Residues of zineb and iprodione in brassica leafy vegetables after applications of ZINEB FUNGICIDE and ROVRAL AQUAFLO FUNGICIDE – Studies AVG1047 and AVG1122

A study was conducted from August 2005 to October 2007 to determine the tissue residue profile of zineb and iprodione when applied to the brassica leafy vegetables red mustard and pak choy. The field component was conducted at field sites at Saint Kilda, South Australia, Pearcedale, Victoria, Stanthorpe, Queensland and Kemps Creek, New South Wales**.** The analytical component was conducted by Agrisearch Analytical Pty Ltd.

The test substances were as follows;

ZINEB FUNGICIDE – a wettable powder formulation containing 800 g/kg zineb as supplied by Barmac Industries.

ROVRAL AQUAFLO FUNGICIDE - a suspension concentrate formulation containing 500 g/L iprodione supplied by Bayer CropScience.

An unreplicated large plot design was used at each test site.

The treatment sampling groups for Site 1, Saint Kilda, South Australia are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	ZINEB	175 (175) g/100 L	14, 7 & 0	0, 7 & 10
3	ROVRAL	1.0 (0.997) L/ha	14, 7 & 0	0, 7 & 10

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 2, Pearcedale, Victoria are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	ZINEB	175 (175) g/100 L	13, 6 & 0	0, 7 & 9
3	ROVRAL	1.0 (1.02) L/ha	13, 6 & 0	0, 7 & 9

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 3, Stanthorpe, Queensland are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	ZINEB	175 (175) g/100 L	14, 6 & 0	0, 7 & 10
3	ROVRAL	1.0 (0.995) L/ha	14, 6 & 0	0, 7 & 10

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 4, Kemps Creek, New South Wales are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	ZINEB	175 (175) g/100 L	14, 7 & 0	0, 7 & 10
3	ROVRAL	1.0 (0.997) L/ha	14, 7 & 0	0, 7 & 10

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of insecticides and fungicides to field grown brassica leafy vegetables. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 0.5 kg was sampled from 12 individual plants of each treatment for each sample. The end plants of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Zineb and iprodione residues were determined according to methods developed by Agrisearch Analytical:

Zineb - “Determination of Dithiocarbamate Fungicide Residues by Carbon Disulfide Generation & GLC/FPD", AATM-S-56, Revision 3, Agrisearch Analytical Pty Ltd, 18 August 2006.

Iprodione - “Determination of Multi-Residues in Fruit and Vegetables using DSPE”, AATM-S-60, Revision 5, Agrisearch Analytical Pty Ltd, 20 February 2006.

The efficiency of the methods in the test facility was monitored by the analysis of control (untreated) samples and control (recovery) samples fortified with zineb and iprodione and analysed concurrently with the test samples. The average results of recovery assays were:

Fortification Level (mg/kg)	Recovery (%) ± RSD (%)	
	Zineb	Iprodione
4.3 as CS_2	67±6	-
0.9 as CS_2	87±18	-
0.05	-	98±6.5

Most of the treated samples of red mustard and pak choy were found to contain quantifiable (>0.1 mg/kg) residues of carbon disulfide after three applications of ZINEB FUNGICIDE made 6 or 7 days apart. At 0 DAT 3 the range of CS_2 was 8.8-25 mg/kg. By 10 DAT 3 the range was 0.4-3.1 mg/kg.

Residues of iprodione greater than the limit of quantitation (0.05 mg/kg) were found in all of the treated samples of red mustard and pak choy after three applications of ROVRAL AQUAFLO FUNGICIDE applied 6 or 7 days apart. Residues of iprodione ranged from 11-70 mg/kg at 0 DAT 3 and 0.22-1.3 mg/kg at 10 DAT 3.

5.6 HAL/GLP/04/03-6; Residues of abamectin, tebuconazole and alpha-cypermethrin in lettuce after applications of VERTIMEC MITICIDE/INSECTICIDE, FOLICUR 430 SC FUNGICIDE and FASTAC DUO INSECTICIDE – Studies AVG1124, AVG47 and AVG1108

The field component of this study was conducted from February 2006 to May 2006 to determine the tissue residue profile of abamectin, tebuconazole and alpha-cypermethrin when applied to lettuce. The study consisted of four field sites at Uraidla, South Australia (leafy lettuce), Pearcedale, Victoria (leafy lettuce), Wyreema, Queensland (head lettuce) and Mangrove Mountain, New South Wales (head lettuce)**.**

The test substances were as follows;

VERTIMEC MITICIDE/INSECTICIDE - an emulsifiable concentrate formulation containing 18 g/L abamectin as the active constituent as manufactured and supplied by Syngenta Crop Protection Pty Limited.

FOLICUR 430 SC FUNGICIDE – a suspension concentrate formulation containing 430 g/L tebuconazole as manufactured and supplied by Bayer CropScience Pty Ltd.

NUFARM FASTAC DUO INSECTICIDE – an emulsifiable concentrate formulation containing 100 g/L alpha-cypermethrin as manufactured and supplied by Nufarm Australia Ltd.

An unreplicated large plot design was used at each test site.

The treatment sampling groups for Site 1 (leafy lettuce), Uraidla, SA are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
3	FOLICUR 430 SC	350 (356) mL/ha	7 & 0	0, 7 & 10
4	FASTAC DUO	400 (397) mL/ha	7 & 0	0, 3 & 7

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 2 (leafy lettuce), Pearcedale, Vic are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
3	FOLICUR 430 SC	350 (364) mL/ha	7 & 0	0, 7 & 9
4	FASTAC DUO	400 (400) mL/ha	7 & 0	0, 2 & 7

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 3 (head lettuce), Wyreema, Qld are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	VERTIMEC	450 (458) mL/ha	28 & 0	0, 3 & 7
3	FOLICUR 430 SC	350 (353) mL/ha	7 & 0	0, 7 & 10

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 4 (head lettuce), Mangrove Mountain, NSW are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	VERTIMEC	450 (450) mL/ha	29 & 0	0, 3 & 7
3	FOLICUR 430 SC	350 (350) mL/ha	8 & 0	0, 7 & 10

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of fungicides and insecticides to field grown lettuce. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 12 plants (half plants from Site 3 (head lettuce), Wyreema, Qld) from each treatment were collected for each sample. The end plants of each plot were not sampled. Whole plants (half plants from Site 3 (head lettuce), Wyreema, Qld), after the removal of roots and obviously decomposed or withered leaves, were taken. Two samples were taken from each treatment on each sampling date with one being the primary Sample and the other the reserve Sample.

Tebuconazole and alpha-cypermethrin residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

“Determination of Multi-Residues in Fruit and Vegetables using DSPE” AATM-S-60, Revision 5, Agrisearch Analytical Pty Ltd, 20th February 2006.

Abamectin residues were determined according to an analytical method developed at the test site:

“Determination of Abamectin in Plant Materials and Processed Fractions”, AATM-11, Agrisearch Analytical Pty Ltd, Rev 3, Oct 03.

The efficiency of the methods in the test site was monitored by the analysis of control (untreated) samples and control (recovery) samples fortified with tebuconazole, alpha-cypermethrin and abamectin and analysed concurrently with the test samples. The average results of recovery assays were:

Fortification Level (mg/kg)	Recovery (%) ± RSD (%)		
	Tebuconazole	Alpha-cypermethrin	Abamectin
0.01 for tebuconazole and abamectin, 0.05 for alpha-cypermethrin	97±16	97±11	78±5

Most of the treated samples were found to contain quantifiable (>0.01 mg/kg for tebuconazole, >0.05 mg/kg for alpha-cypermethrin) residues of tebuconazole and alpha-cypermethrin. Some of the treated samples were found to contain quantifiable (>0.01 mg/kg) residues of abamectin

Tebuconazole/FOLICUR 430 SC;
Residues of tebuconazole in lettuce were a maximum of 0.21 mg/kg 9 days after 2 applications of FOLICUR 430 SC applied at 7 to 8 day intervals.

Alpha-cypermethrin/FASTAC DUO;
Residues of alpha-cypermethrin in lettuce were a maximum of 0.55 mg/kg 9 days after 2 applications of FASTAC DUO applied at 7 day intervals.

Abamectin/VERTIMEC;
Residues of abamectin in lettuce were <LOD (0.002 mg/kg) 3 days after 2 applications of VERTIMEC applied at 28 to 29 day intervals.

5.7 HAL/GLP/04/03-7; Residues of lambda-cyhalothrin, metalaxyl-M + mancozeb and propiconazole in silver beet after applications of KARATE WITH ZEON TECHNOLOGY INSECTICIDE, RIDOMIL GOLD MZ WG SYSTEMIC AND PROTECTIVE FUNGICIDE and TILT 250 EC SYSTEMIC FUNGICIDE – Studies AVG117, AVG777 and AVG772

The field component of this study was conducted from February 2006 to June 2006 to determine the tissue residue profile of lambda-cyhalothrin, metalaxyl-m + mancozeb and propiconazole when applied to silverbeet. The study consisted of two field sites; Saint Kilda, South Australia and Mangrove Mountain, New South Wales**.**

The test substances were as follows;

KARATE WITH ZEON TECHNOLOGY INSECTICIDE - a suspension concentrate formulation containing 250 g/L lambda-cyhalothrin as the active constituent as manufactured and supplied by Syngenta Crop Protection Pty Ltd.

RIDOMIL GOLD MZ WG SYSTEMIC AND PROTECTIVE FUNGICIDE - a water dispersible granule formulation containing 640 g/kg mancozeb and 40 g/kg metalaxyl-M as the active constituents as manufactured and supplied by Syngenta Crop Protection Pty Ltd.

TILT 250 EC SYSTEMIC FUNGICIDE - an emulsifiable concentrate formulation containing 250 g/L propiconazole as the active constituent as manufactured and supplied by Syngenta Crop Protection Pty Ltd.

An unreplicated large plot design was used at each test site.

The treatment sampling groups for Site 1, Saint Kilda, SA are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	KARATE ZEON	36 (36.5) mL/ha	21, 14, 7, 0	0, 2, 5
3	RIDOMIL GOLD MZ	2.5 (2.49) kg/ha	7, 0	0, 7, 14
4	TILT	500 (495) mL/ha	10, 0	0, 7, 10

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 2, Mangrove Mountain, NSW are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	KARATE ZEON	36 (36.5) mL/ha	22, 15, 7, 0	0, 2, 5
3	RIDOMIL GOLD MZ	2.5 (2.53) kg/ha	7, 0	0, 7, 14
4	TILT	500 (505) mL/ha	11, 0	0, 7, 10

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of insecticides and fungicides to field grown silverbeet. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 1 kg of leaf was sampled from at least 12 individual plants of each treatment for each sample. Roots and adhering soil and obviously decomposed or withered leaves were removed. The end plants of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Lambda-cyhalothrin, metalaxyl, propiconazole and mancozeb residues were determined according to methods developed by Agrisearch Analytical:

Lambda-cyhalothrin, metalaxyl, propiconazole - “Determination of Multi-Residues in Fruit and Vegetables using DSPE”, AATM-S-60, Revision 5, Agrisearch Analytical Pty Ltd, 20 February 2006.

Mancozeb - “Determination of Dithiocarbamate Fungicide Residues by Carbon Disulfide Generation & GLC/FPD", AATM-S-56, Revision 3, Agrisearch Analytical Pty Ltd, 18 August 2006.

The efficiency of the method in the test facility was monitored by the analysis of control (untreated) samples and control (recovery) samples fortified with the various active ingredients and analysed concurrently with the test samples. The average results of recovery assays were:

Fortification Level (mg/kg)	Recovery (%) ± RSD (%)		
	Lambda-cyhalothrin	Metalaxyl	Propiconazole
0.05	108±6	99±8	100±9

Fortification Level as CS_2 (mg/kg)	Recovery (%) ± RSD (%)
	Mancozeb
0.18	113±9
1.8	90±6
4.4	91±18
22	98

Most of the treated samples of silverbeet were found to contain quantifiable (>0.05 mg/kg) residues of cyhalothrin after four applications of KARATE ZEON INSECTICIDE made 6 or 7 days apart. Residues of cyhalothrin ranged from 0.13-0.24 mg/kg at 2 DAT 4 to 0.11-0.13 mg/kg at 5 DAT 4.

Most of the treated samples of silverbeet were found to contain quantifiable (>0.05 mg/kg) residues of metalaxyl after two applications of RIDOMIL GOLD MZ FUNGICIDE made 7 days apart. Residues of metalaxyl ranged from 0.77-2.2 mg/kg at 0 DAT 2, <LOQ-0.19 mg/kg at 7 DAT 2 and <LOD-0.11 mg/kg at 14 DAT 2.

All of the treated samples of silverbeet were found to contain quantifiable mancozeb residues (>0.1 mg/kg) expressed as carbon disulfide after two applications of RIDOMIL GOLD MZ FUNGICIDE made 7 days apart. At 0 DAT 2 the range of CS_2 was 24-26 mg/kg and at 7 DAT 2 was 2.6-5.5 mg/kg. By 14 DAT 2 the range was 1.3-3.0 mg/kg.

All of the treated samples of silverbeet were found to contain quantifiable (>0.05 mg/kg) residues of propiconazole after two applications of TILT FUNGICIDE made 10 or 11 days apart. At 0 DAT 2 the range of propiconazole was 1.4-5.1 mg/kg and at 7 DAT 2 was 0.15-0.21 mg/kg. By 10 DAT 2 the range was 0.12-0.18 mg/kg.

5.8 HAL/GLP/04/03-8; Residues of benalaxyl + mancozeb and spinosad in spring onions after applications of GALBEN M SYSTEMIC FUNGICIDE and SUCCESS NATURALYTE INSECT CONTROL – Studies AVG74 and AVG1171

A study was conducted from August 2005 to September 2007 to determine the tissue residue profile of spinosad when applied to spring onions. The field component of the study was conducted from March 2006 to May 2006. The field component was done at field sites at Saint Kilda, South Australia, Pearcedale, Victoria, Coominya, Queensland and Kemps Creek, New South Wales. The analytical component was done by Agrisearch Analytical at Rozelle, New South Wales.

The test substance was as follows;

SUCCESS NATURALYTE INSECT CONTROL - a suspension concentrate formulation containing 120 g/L spinosad as the active constituent as manufactured and supplied by Dow AgroSciences (NZ) Limited.

The GALBEN M SYSTEMIC FUNGICIDE section of the study was cancelled on notification from the sponsor.

An unreplicated large plot design was used at each test site.

The treatment sampling groups for Site 1, Saint Kilda, SA are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	Not applicable	Not applicable	Not applicable	Not applicable
3	SUCCESS NATURALYTE	800 (778) mL/ha	7, 3 & 0	0, 3 & 5

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 2, Pearcedale, Vic are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	Not applicable	Not applicable	Not applicable	Not applicable
3	SUCCESS NATURALYTE	800 (827) mL/ha	6, 3 & 0	0, 3 & 4

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 3, Coominya, Qld are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	Not applicable	Not applicable	Not applicable	Not applicable
3	SUCCESS NATURALYTE	800 (793) mL/ha	6, 4 & 0	0, 3 & 5

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatment sampling groups for Site 4, Kemps Creek, NSW are presented in the table below:

No.	Formulation	Rate of Formulation Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1	Untreated control			0
2	Not applicable	Not applicable	Not applicable	Not applicable
3	SUCCESS NATURALYTE	800 (800) mL/ha	6, 3 & 0	0, 3 & 5

*Averaged over all applications
DBFS – days before first sampling
DALA – days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of insecticides to field grown spring onions. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

Approximately 2 kg of whole plants were sampled from at least 24 individual plants of each treatment for each sample. Roots and adhering soil were removed. The end plants of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Spinosad residues were determined according to an analytical method developed by Dow AgroSciences:

"Determination of Spinosad Residues in Dry Agricultural Crops by High Performance Liquid Chromatography with + APCI Mass Spectrometry Detection", Method No. GRM 00.04, Dow AgroSciences, Letcombe Laboratory, 4 December 2000.

The efficiency of the method in the test facility was monitored by the analysis of control (untreated) samples and control (recovery) samples fortified with spinosad and analysed concurrently with the test samples. The average results of recovery assays were:

Fortification Level (mg/kg)	Recovery (%) ± RSD (%)
	Spinosad
0.05	83±13

Residues of spinosad greater than the limit of detection (0.01 mg/kg) were found in some of the treated samples of spring onions.

Spinosad/SUCCESS NATURALYTE;
Residues of spinosad in spring onions were <LOQ (0.05 mg/kg) 4-5 days after 3 applications of SUCCESS NATURALYTE applied at 2 to 4 day intervals.

5.9 HAL/GLP/04/03-9; Residues of pirimicarb, iprodione and methomyl in celeriac after applications of PIRIMOR WG APHICIDE, ROVRAL AQUAFLO FUNGICIDE and LANNATE-L INSECTICIDE

This study was conducted to determine the tissue residue profile of pirimicarb, iprodione and methomyl in celeriac. The study consisted of two field sites; Uraidla South Australia and Gooburrum Queensland. The study co-ordination was conducted by Agrisearch Services Pty Ltd at Orange, New South Wales and the analytical component was conducted at Agrisearch Analytical Pty Ltd at Rozelle, New South Wales. The study was conducted under the OECD Principles of Good Laboratory Practice (GLP).

The test substances were as follows:

PIRIMOR WG APHICIDE - a water dispersible granule formulation containing 500 g/kg pirimicarb as the active constituent as marketed by Syngenta Crop Protection Pty Limited.

ROVRAL AQUAFLO FUNGICIDE - a suspension concentrate formulation containing 500 g/L iprodione as the active constituent as marketed by Bayer CropScience Pty Ltd.

LANNATE-L INSECTICIDE - a liquid concentrate formulation containing 225 g/L methomyl as the active constituent as marketed by DuPont (Australia) Limited.

An unreplicated unrandomised single plot design was used at each test site.

The treatments and sampling times for Trial 5139, Uraidla South Australia, are presented in the table below:

Number	Treatment	Rate Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1.	Untreated control			0
2.	PIRIMOR	1.0 (1.0) kg/ha	10, 0	0, 2, 5
3.	ROVRAL	1.0 (1.0) L/ha	29, 14, 0	0, 1, 5
4.	LANNATE-L	2.0 (2.0) L/ha	14, 7, 0	0, 1, 5

*Averaged over all applications
DBFS - days before first sampling
DALA - days after last application

The treatments and sampling times for Trial 5140, Gooburrum Queensland are presented in the table below:

Number	Treatment	Rate Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1.	Untreated control			0
2.	PIRIMOR	1.0 (1.0) kg/ha	11, 0	0, 2, 6
3.	ROVRAL	1.0 (1.0) L/ha	29, 15, 0	0, 1, 6
4.	LANNATE-L	2.0 (2.1) L/ha	15, 8, 0	0, 1, 6

*Averaged over all applications
DBFS - days before first sampling
DALA - days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of insecticides and fungicides in celeriac. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

Greater than 2 kg of roots were sampled from at least 12 individual plants of each treatment for each sample. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Pirimicarb, iprodione and methomyl residues were determined according to methods developed by Agrisearch Analytical:

"Determination of Multi-Residues in Fruit and Vegetables using DSPE", AATM-S-60, Revision 5, Agrisearch Analytical Pty Ltd, 20 February 2006.

Some of the treated samples of celeriac were found to contain quantifiable (>0.05 mg/kg) residues of pirimicarb and metabolites after two applications of PIRIMOR made 10-11 days apart. Residues of pirimicarb and metabolites ranged from 0.03-0.04 mg/kg at 2 DAT 2 to 0.02-0.04 mg/kg at 5-6 DAT 2.

All of the treated samples of celeriac were found to contain quantifiable (>0.05 mg/kg) residues of iprodione after three applications of ROVRAL made 14-15 days apart. Residues of iprodione ranged from 0.23-0.25 mg/kg at 1 DAT 3 to 0.18-0.31 mg/kg at 5-6 DAT 3.

One of the treated samples of celeriac was found to contain quantifiable (>0.05 mg/kg) residues of methomyl and metabolites after three applications of LANNATE-L made 7-8 days apart. Residues of methomyl and metabolites ranged from <LOD (0.01 mg/kg)-0.03 mg/kg at 1 DAT 3 to <LOD at 5-6 DAT 3.

5.10 HAL/GLP/04/03-10; Residues of alpha-cypermethrin, buprofezin, indoxacarb, metalaxyl-M + mancozeb, and propiconazole in celery after applications of FASTAC DUO INSECTICIDE, APPLAUD INSECTICIDE, DUPONT AVATAR INSECTICIDE, RIDOMIL GOLD MZ WG SYSTEMIC AND PROTECTIVE FUNGICIDE and TILT 250 EC SYSTEMIC FUNGICIDE – Studies AVG1107, AVG191, AVG1158, AVG846 and AVG158

This study was conducted to determine the tissue residue profile of alpha-cypermethrin, buprofezin, indoxacarb, metalaxyl + mancozeb, and propiconazole in celery. The study consisted of two field sites; Clyde, Victoria and Virginia, South Australia. The study co-ordination was conducted by Agrisearch Services Pty Ltd at Orange, New South Wales and the analytical component was conducted at Agrisearch Analytical Pty Ltd at Rozelle, New South Wales. The study was conducted under the OECD Principles of Good Laboratory Practice (GLP).

The test substances were as follows:

FASTAC DUO INSECTICIDE - an emulsifiable concentrate formulation containing 100 g/L alpha-cypermethrin as the active constituent as manufactured and supplied by BASF Australia Limited.

APPLAUD INSECTICIDE - a suspension concentrate formulation containing 400 g/L buprofezin as the active constituent as manufactured and supplied by Dow AgroSciences Australia Limited.

DUPONT AVATAR INSECTICIDE - a water dispersible granule formulation containing 400 g/kg indoxacarb as the active constituent as manufactured and supplied by DuPont Australia Limited.

RIDOMIL GOLD MZ WG SYSTEMIC AND PROTECTIVE FUNGICIDE - a water dispersible granule formulation containing 640 g/kg mancozeb and 40 g/kg metalaxyl-M as the active constituents as manufactured and supplied by Syngenta Crop Protection Pty Ltd.

TILT 250 EC SYSTEMIC FUNGICIDE - an emulsifiable concentrate formulation containing 250 g/L propiconazole as the active constituent as manufactured and supplied by Syngenta Crop Protection Pty Ltd.

An unreplicated randomised single plot design was used at each test site.

The treatments and sampling times for Trial 5144, Clyde, Victoria, are presented in the table below:

Number	Treatment	Rate Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1.	Untreated control			0
2.	FASTAC	400 (401) mL/ha	9, 0	0, 4, 8
3.	APPLAUD	60 (60) mL/100 L	15, 0	0, 4, 8
4.	AVATAR	170 (170) g/ha	15, 9, 0	0, 8, 11
5.	RIDOMIL GOLD MZ	2.5 (2.51) kg/ha	9, 0	0, 8, 13
6.	TILT	500 (497) mL/ha	15, 9, 0	0, 8, 13

*Averaged over all applications
DBFS - days before first sampling
DALA - days after last application

The treatments and sampling times for Trial 5143, Virginia, South Australia are presented in the table below:

Number	Treatment	Rate Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1.	Untreated control			0
2.	FASTAC	400 (397) mL/ha	7, 0	0, 3, 7
3.	APPLAUD	60 (60) mL/100 L	13, 0	0, 3, 7
4.	AVATAR	170 (170) g/ha	13, 7, 0	0, 7, 10
5.	RIDOMIL GOLD MZ	2.5 (2.51) kg/ha	7, 0	0, 7, 14
6.	TILT	500 (499) mL/ha	13, 7, 0	0, 7, 14

*Averaged over all applications
DBFS - days before first sampling
DALA - days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of insecticides and fungicides in celery. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 2 kg of leaves and stalks were sampled from at least 12 individual plants of each treatment for each sample. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Lambda-cyhalothrin, metalaxyl, propiconazole and mancozeb residues were determined according to methods developed by Agrisearch Analytical:

Alpha-cypermethrin, buprofezin, indoxacarb, metalaxyl, propiconazole - “Determination of Multi-Residues in Fruit and Vegetables using DSPE”, AATM-S-60, Revision 5, Agrisearch Analytical Pty Ltd, 20 February 2006.

Mancozeb - “Determination of Dithiocarbamate Fungicide Residues by Carbon Disulfide Generation & GLC/FPD", AATM-S-56, Revision 3, Agrisearch Analytical Pty Ltd, 18 August 2006.

All of the treated samples of celery were found to contain quantifiable (>0.05 mg/kg) residues of alpha-cypermethrin after two applications of FASTAC DUO INSECTICIDE made 7 or 9 days apart. Residues of alpha-cypermethrin ranged from 0.32-0.41 mg/kg at 3-4 DAT 2 to 0.16-0.39 mg/kg at 7-8 DAT 2.

Most of the treated samples of celery were found to contain quantifiable (>0.05 mg/kg) residues of buprofezin after two applications of APPLAUD INSECTICIDE made 13 or 15 days apart. Residues of buprofezin ranged from <LOD-0.18 mg/kg at 3-4 DAT 2 to 0.13-0.14 mg/kg at 7-8 DAT 2.

Most of the treated samples of celery were found to contain quantifiable (>0.05 mg/kg) residues of indoxacarb after three applications of DUPONT AVATAR INSECTICIDE made 6-9 days apart. Residues of indoxacarb ranged from <LOQ-0.18 mg/kg at 7-8 DAT 3 to 0.05-0.14 mg/kg at 10-11 DAT 3.

Half of the treated samples of celery were found to contain quantifiable (>0.05 mg/kg) residues of metalaxyl after two applications of RIDOMIL GOLD MZ SYSTEMIC AND PROTECTIVE FUNGICIDE made 7 or 9 days apart. Residues of metalaxyl ranged from <LOQ-0.05 mg/kg at 7-8 DAT 2. Residues of metalaxyl were below the quantifiable level at 13-14 DAT 2.

All of the treated samples of celery were found to contain quantifiable (>0.05 mg/kg) residues of propiconazole after three applications of TILT 250 EC SYSTEMIC FUNGICIDE made 6-9 days apart. Residues of propiconazole ranged from 0.10-0.32 mg/kg at 7-8 DAT 3 to 0.10-0.17 mg/kg at 13-14 DAT 3.

All of the treated samples of celery were found to contain quantifiable mancozeb residues (>0.1 mg/kg) expressed as carbon disulfide after two applications of RIDOMIL GOLD MZ SYSTEMIC AND PROTECTIVE FUNGICIDE made 7 or 9 days apart. Residues of CS_2 ranged from 0.2-7.5 mg/kg at 7-8 DAT 2 to 0.1-1.0 mg/kg at 13-14 DAT 2.

5.11 HAL/GLP/04/03-11; Residues of bentazone, tebuconazole, imidacloprid, indoxacarb and cyanazine in snow peas and sugar snap peas after applications of BASF BASAGRAN POST-EMERGENCE HERBICIDE, FOLICUR 430 SC FUNGICIDE, CONFIDOR 200 SC INSECTICIDE, DUPONT AVATAR INSECTICIDE and BLADEX 900 WG HERBICIDE – Studies AVG1114, AVG1112, AVG1126, AVG1095 and AVG1115

This study was conducted to determine the tissue residue profile of bentazone, tebuconazole, imidacloprid, indoxacarb and cyanazine in snow peas and sugar snap peas. The study consisted of four field sites; Virginia South Australia, Wonthaggi Victoria, Horsley Park New South Wales and Gooburrum Queensland. The study co-ordination was conducted by Agrisearch Services Pty Ltd at Orange, New South Wales and the analytical component was conducted at Agrisearch Analytical Pty Ltd at Rozelle, New South Wales. The study was conducted under the OECD Principles of Good Laboratory Practice (GLP).

The test substances were as follows:

BASAGRAN POST-EMERGENCE HERBICIDE - a soluble liquid formulation containing 480 g/L bentazone as the active constituent as marketed by Crop Care Australasia Pty Ltd Limited.

FOLICUR 430 SC FUNGICIDE - a suspension concentrate formulation containing 430 g/L tebuconazole as the active constituent as manufactured and supplied by Bayer CropScience Pty Ltd.

CONFIDOR 200 SC INSECTICIDE - a suspension concentrate formulation containing 200 g/L imidacloprid as the active constituent as manufactured and supplied by Bayer CropScience Pty Ltd.

DUPONT AVATAR INSECTICIDE - a water dispersible granule formulation containing 400 g/kg indoxacarb as the active constituent as manufactured and supplied by DuPont Australia Limited.

BLADEX 900 WG HERBICIDE - a water dispersible granule formulation containing 900 g/kg cyanazine as the active constituents as distributed by Agnova Australia Limited.

An unreplicated randomised single plot design was used at each test site.

The treatments and sampling times for Trial 5146, Virginia South Australia, are presented in the table below:

Number	Treatment	Rate Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1.	Untreated control			0
2.	BASAGRAN	3.0 (2.91) L/ha	28	28, 35
3.	FOLICUR	145 (145.5) mL/ha	14, 0	0, 3, 5
6.	BLADEX	2.2 (2.2) kg/ha	28	28

*Averaged over all applications
DBFS - days before first sampling
DALA - days after last application

The treatments and sampling times for Trial 5147, Wonthaggi Victoria are presented in the table below:

Number	Treatment	Rate Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1.	Untreated control			0
2.	BASAGRAN	3.0 (3.12) L/ha	27	27, 34
3.	FOLICUR	145 (154.5) mL/ha	14, 0	0, 4, 6
6.	BLADEX	2.2 (2.29) kg/ha	27	27

*Averaged over all applications
DBFS - days before first sampling
DALA - days after last application

The treatments and sampling times for Trial 5148, Horsley Park New South Wales are presented in the table below:

Number	Treatment	Rate Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1.	Untreated control			0
3.	FOLICUR	145 (149.9) mL/ha	14, 0	0, 3, 5
4.	CONFIDOR	300 (307.5) mL/ha	7	7, 14
5.	AVATAR	170 (174.2) g/ha	14, 7, 0	0, 7, 10

*Averaged over all applications
DBFS - days before first sampling
DALA - days after last application

The treatments and sampling times for Trial 5149, Gooburrum Queensland are presented in the table below:

Number	Treatment	Rate Applied (Actual*)	Application Times DBFS	Sampling Times DALA
1.	Untreated control			0
3.	FOLICUR	145 (133) mL/ha	14, 0	0, 3, 5
4.	CONFIDOR	300 (303.3) mL/ha	7	0, 7, 10
5.	AVATAR	170 (159.6) g/ha	14, 7, 0	0, 7, 10

*Averaged over all applications
DBFS - days before first sampling
DALA - days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of herbicides, insecticides and fungicides in snow peas and sugar snap peas. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

Approximately 1 kg of green pods were sampled from at least 12 individual plants of each treatment for each sample. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Bentazone, tebuconazole, indoxacarb and cyanazine residues were determined according to methods developed by Agrisearch Analytical:

“Determination of Multi-Residues in Fruit and Vegetables using DSPE”, AATM-S-60, Revision 5, Agrisearch Analytical Pty Ltd, 20 February 2006.

Imidacloprid residues were determined according to the following analytical method supplied by Bayer Australia Limited.

"Method of determining imidacloprid residues in plant materials", F.J.Placke and E.Weber, Pfanzenschutz-Nachrichten Bayer 46/1993.

None of the treated samples of snow peas or sugar snap peas were found to contain detectable (>0.01 mg/kg) residues of bentazone after a single application of BASF BASAGRAN POST-EMERGENCE HERBICIDE made 27-28 or 34-35 days before sampling.

All of the treated samples of snow peas and sugar snap peas were found to contain quantifiable (>0.01 mg/kg) residues of tebuconazole after two applications of FOLICUR 430 SC FUNGICIDE made 14 days apart. Residues of tebuconazole ranged from 0.04-0.13 mg/kg at 3-4 DAT 2 to 0.02-0.08 mg/kg at 5-6 DAT 2.

Most of the treated samples of snow peas were found to contain less than quantifiable (>0.05 mg/kg) residues of imidacloprid after a single application of CONFIDOR 200 SC INSECTICIDE. Residues of imidacloprid ranged from <LOD to <LOQ mg/kg at 7 DAT.

Most of the treated samples of snow peas were found to contain quantifiable (>0.05 mg/kg) residues of indoxacarb after three applications of DUPONT AVATAR INSECTICIDE made 7 days apart. Residues of indoxacarb ranged from <LOD-0.19 mg/kg at 7 DAT 3 to <LOQ-0.08 mg/kg at 10 DAT 3.

None of the treated samples of snow peas or sugar snap peas were found to contain detectable (>0.01 mg/kg) residues of cyanazine after a single application of BLADEX 900 WG HERBICIDE made 27-28 days before sampling.

6. TECHNOLOGY TRANSFER

The data generated from the studies reported on here have been included or will be included in submissions to the Australian Pesticides and Veterinary Medicines Authority. These submissions are for permit applications, pesticide label extensions or for inclusion in complete pesticide registration applications. The results of the applications are disseminated on the APVMA website, the Government Gazette and by industry publications. There is also an ongoing rationalisation of pesticide permits and the transfer of permits to current pesticide labels.

7. RECOMMENDATIONS

The major outcome of this project is that pesticides that could not be legally used by vegetable growers will now be available, thus providing growers with a broader range of options in the control of diseases and insect pests from which their crops suffer.

This project has been part of a larger programme of research that has been conducted over the past few years. Although the outcomes of this project have been met there is an ongoing need for growers to have access to newer and better pesticides and so similar projects should be planned and conducted in the future.