



Final Report

Generation of Residue Data for Pesticide Minor-Use Permit Applications in Vegetable Crops 2014/ 2015

Bill Frost
Eurofins Agrisearch

Project Number: VG14039

Author: Sara Pengelly

VG14039

This project has been funded by Hort Innovation using the research and development vegetable levy and funds from the Australian Government.

Hort Innovation makes no representations and expressly disclaims all warranties (to the extent permitted by law) about the accuracy, completeness, or currency of information in *Generation of Residue Data for Pesticide Minor-Use Permit Applications in Vegetable Crops 2014/ 2015*.

Reliance on any information provided by Hort Innovation is entirely at your own risk. Hort Innovation is not responsible for, and will not be liable for, any loss, damage, claim, expense, cost (including legal costs) or other liability arising in any way (including from Hort Innovation or any other person's negligence or otherwise) from your use or non-use of *Generation of Residue Data for Pesticide Minor-Use Permit Applications in Vegetable Crops 2014/ 2015*, or from reliance on information contained in the material or that Hort Innovation provides to you by any other means.

ISBN 978 0 7341 4348 8

Published and distributed by:
Hort Innovation
Level 8, 1 Chifley Square
Sydney NSW 2000
Tel: (02) 8295 2300
Fax: (02) 8295 2399

© Copyright 2017

Contents

Summary	3
Keywords.....	4
Introduction	5
Methodology	6
Results	10
Outputs	18
Outcomes	19
Evaluation and Discussion	20
Recommendations.....	21
Intellectual Property/Commercialisation	22
Acknowledgements.....	23

Summary

In Australia, before an agrochemical product can be sold or used, the Australian Pesticides and Veterinary Medicines Authority (APVMA) must first register it. 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 horticultural crops are too small individually for agrochemical manufacturers to bear the high cost of registering products for use. As a result, horticulturalists are often placed in situations where they risk severe crop losses from insects, weeds and diseases. On the other hand, they risk buyers rejecting their produce and other penalties if they are detected using products that are not registered.

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/data that verifies that the permitted use will be effective and will not have any harmful effects on humans, the crops or the environment.

In order for the permits to be renewed, Horticulture Innovation Australia Ltd (Hort Innovation), after consultation with the vegetable industry, requested the generation of residue and crop safety data to support the minor-use permit applications to the APVMA. The key outcome from this project is the gaining of approval and renewal from the APVMA for use of the listed pesticide uses under the APVMA minor-use permits and eventual registration of the uses.

The approval by the APVMA of the minor-use permit applications, that have been submitted as part of this project, will aide vegetable growers by granting or renewing access to previously unavailable pesticide options for the control of various pests and diseases they encounter throughout the season.

In this project a total of seven field residue trials as part of three studies were conducted to determine the residue levels and crop safety following the application of various pesticides to support minor-use permit applications in eggplant and sweet potato, baby spinach and chicory as well as water chestnut.

This project has been funded by Hort Innovation, using the Hort Innovation's Vegetable R&D Levy and contributions from the Australian Government. Residue data for the three residues studies, that are part of project VG14039, have been reported in their respective final GLP compliant reports which were submitted to the Hort Innovation R&D Manager and milestones@horticulture.com.au. Residue data generated was used to support minor-use permit renewal applications for the various active ingredients and has been submitted to the APVMA.

Keywords

Baby spinach

Chicory, blue daisy, blue dandelion, blue sailors, blue weed, bunk, coffeeweed, cornflower, hendibeh, horseweed, ragged sailors, succory, wild bachelor's buttons, wild endive

Eggplant, aubergine

Fluazifop-p-butyl

Fungicide

Herbicide

Sweet potato

Trifloxystrobin

Water chestnut

Introduction

The minor use program through Horticulture Australia Limited (HAL) now Horticulture Innovation Australia (Hort Innovation), initiated the strategic agrochemical review process (SARP) to give strategic direction to the minor use program investments as part of the project MT10029 - Managing pesticide access in horticulture. This approach accommodates IPM compatibility and improves the scope for resistance management, sound biological profile, and residue and trade acceptance for domestic and export markets.

This review process provides industry with sound pesticide options for the future that the industry can pursue for registration with the manufacturer, or minor-use permits with APVMA for clearly identified crop protection needs, many of which will also assist the expansion of effective IPM strategies. The studies in this project were prioritised by industry before being undertaken.

The aim of this project was to generate pesticide residue data, to support minor-use permit applications to the Australian Pesticides and Veterinary Medicines Authority (APVMA) as prioritized by the vegetable industry through the SARP review process.

Three crop residue studies were conducted with a fungicide or herbicide. These studies were conducted at seven different field sites in both outdoor and protected cropping environments in New South Wales, Queensland, Victoria, and South Australia.

The data generated has been used to support new or ongoing minor use permit applications to the APVMA.

This report contains the experimental methods used and presents the results obtained and details of the permit applications completed under the VG14039 project. Final GLP compliant reports have been submitted to Horticulture Innovation Australia Limited for submission to the APVMA together with the relevant renewal application for minor-use permits.

Methodology

Seven crop residue trials in a total of three studies were completed as detailed in the following table:

Permit Application/ Renewal	Eurofins Study Number	Study Title	Active	Crop	Trials
Renewal of PER14282	HAL/GLP/14/03	Determination Of The Residues Of Fluazifop-P-Butyl In Water Chestnuts And Lotus Root	Fluazifop-p-butyl	Water chestnut*	S14-05798-03 – Qld*
Renewal of PER14484	HAL/GLP/14/05	Determination Of The Residues Of Fluazifop-P-Butyl In Eggplant And Sweet Potato	Fluazifop-p-butyl	Eggplant	140843 – Vic 140844 – Qld
				Sweet Potato	140845 – Qld 140846 – Qld
Renewal of PER14494	HAL/GLP/14/06	Determination Of The Residues Of Trifloxystrobin In Protected-Structure Baby Spinach And Chicory	Trifloxystrobin	Baby spinach - PC	140848 - SA
				Chicory - PC	140849 - NSW

PC – protected cropping, *Only a single trial on water chestnut conducted as lotus root trial was unable to be conducted and was hence cancelled.

Each study was conducted following a separate GLP compliant Study Plan. Draft Study Plans were prepared for each study and distributed to the Hort Innovation Project Reference group prior to being evaluated by the Eurofins Quality Assurance Unit for comment. Study Plans were signed by the Study Director and Hort Innovation representative then distributed to field personnel.

Test samples with accompanying Certificates of Authenticity (CoA) were obtained from the various manufacturers and distributed to the Test Facilities at each location. The field component was completed by Eurofins Agrosience Services personnel following the company's 'Standard Operating Procedures' which comply with the OECD Principles of Good Laboratory Practice.

Field sites were selected in commercially grown crops in regions where those crops are commonly produced. Each study was conducted using a single block unrandomised design. Plots were labelled as outlined in the Study Plans.

The treatments were applied in a manner that simulated best commercial practice for the application of a particular product in a particular crop as detailed in each Study Plan.

Samples were collected at timings outlined in the relevant Study Plan and frozen within 3 hours of collection. Frozen samples were dispatched to the analytical laboratory upon completion of the field phase.

Samples were dispatched frozen, with accompanying 'Chain of Custody' (COC) documentation, to Eurofins Agrosience Testing and receipt was acknowledged by return of the COC.

Details of test sites and analytical procedures for each study are presented below:

PER14282 - HAL/GLP/14/03 - DETERMINATION OF THE RESIDUES OF FLUAZIFOP-P-BUTYL IN WATER CHESTNUTS AND LOTUS ROOT – VG14039, PER14482

The treatments and sampling times are presented in the table below:

Trial	Treatment	Nominal Rate Applied	Application Times	Sampling Times
S14-05798-03 Water Chestnut Toowoomba, Queensland	1. Untreated	Nil	-	0 days after treatment
	2. Fluzifop-p-butyl* ^	3.3 L/ha	0 days before harvest	0 days after treatment then 3 and 7 weeks after treatment

* A registered herbicide product containing 128 g/L fluzifop-p-butyl.

^ + BS1000 [wetting agent] at 200 mL/100L

Note: Eurofins was unable to locate a commercially grown lotus root crop. In addition, our efforts to grow a crop resulted in root growth that was not acceptable for sampling to provide a commercially representative sample. After consultation with Horticulture Innovation Australia and the APVMA the trial was cancelled on 15 June 2016. No additional trial was conducted in place of the cancelled lotus root trial.

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

At least 250 grams of water chestnut corms were sampled from at least 12 individual plants of each treatment for each sample. The samples were taken from all parts of the plot, with the exception of the plot ends. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

No phytotoxicity symptoms were observed as a result of the treatment applied throughout this study.

Fluzifop residues were determined according to the following analytical method:

"Analysis of Acidic Pesticides in Wheat Flour Samples by LC-MS(/MS) using the QuEChERS Method", CRL for Single Residue Methods, 07 May 2007.

PER 14484 - HAL/GLP/14/05 - DETERMINATION OF THE RESIDUES OF FLUAZIFOP-P-BUTYL IN EGGPLANT AND SWEET POTATO – VG14039, PER14484

The treatments and sampling times are presented in the table below:

Trial	Treatment	Nominal Rate Applied	Application Times	Sampling Times
140843 Eggplant Shepparton East, Victoria	1. Untreated	Nil	-	28 days after treatment
	2. Fluazifop-p-butyl* ^	2.0 L/ha	28 days before harvest	7, 14, 21 and 28 days after treatment
140844 Eggplant Ayr, Queensland	1. Untreated	Nil	-	27 days after treatment
	2. Fluazifop-p-butyl* ^	2.0 L/ha	27 days before harvest	7, 13, 22 and 27 days after treatment
140845 Sweet Potato Gatton, Queensland	1. Untreated	Nil	-	10 weeks after treatment
	2. Fluazifop-p-butyl* ^	3.3 L/ha	10 weeks before harvest	5, 7 and 10 weeks after treatment
140846 Sweet Potato Atherton, Queensland	1. Untreated	Nil	-	10 weeks after treatment
	2. Fluazifop-p-butyl* ^	3.3 L/ha	10 weeks before harvest	5, 7 and 10 weeks after treatment

* A registered herbicide product containing 128 g/L fluazifop-p-butyl.

^ + BS1000 [wetting agent] at 200 mL/100L

The treatments were applied in a manner that simulated best commercial practice for the application of a herbicide in eggplant and sweet potatoes. Treatments were applied by hand-held, gas-powered boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant, in total volumes of at least 200 L/ha.

At least two kilograms of eggplant fruit or sweet potato tubers were sampled from at least 12 individual plants of each treatment for each sample (with the exception of site 140846, where one kilogram samples of sweet potato tubers were collected at 5 WAT). The samples were taken from all parts of the plot, however the ends 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.

Fluazifop residues were determined according to the analytical method:

"Analysis of Acidic Pesticides in Wheat Flour Samples by LC-MS(/MS) using the QuEChERS Method", CRL for Single Residue Methods, 07 May 2007.

PER 14494 - HAL/GLP/14/06 - DETERMINATION OF THE RESIDUES OF TRIFLOXYSTROBIN IN PROTECTED-STRUCTURE BABY SPINACH AND CHICORY – VG14039, PER14494

The treatments and sampling times are presented in the table below:

Trial	Treatment	Nominal Rate Applied	Application Times	Sampling Times DALA
140848 Baby Spinach Virginia, South Australia	1. Untreated	Nil	-	14 days after the last application
	2. Trifloxystrobin*	3 x 300 g/ha	17, 10 and 3 days before harvest	0, 1, 3, 7, 14 days after the last application
140849 Chicory Cobbitty, New South Wales	1. Untreated	Nil	-	3 days after the last application
	2. Trifloxystrobin*	3 x 300 g/ha	17, 10 and 3 days before harvest	0, 1, 3, 7, 14 days after the last application

* A registered fungicide product containing 500 g/kg trifloxystrobin

The treatments were applied in a manner that simulated best commercial practice for the application of a fungicide in spinach and chicory grown in protected-structures. Treatments were applied by hand-held, gas-powered boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least one kilogram of foliage was sampled from at least 12 individual points within each plot for each sample. The samples were taken from all parts of the plot, with the exception of the plot ends. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

No evidence of crop damage was recorded at any stage of the trials, indicating that multiple applications of trifloxystrobin are safe to protected-structure baby spinach and chicory.

Trifloxystrobin and its acid metabolite residues were determined according to an analytical method developed by Eurofins Agrosience Testing Pty Ltd:

"Determination of Multi-Pesticide Residues in Plant using DSPE" AATM-S-60.1, Revision 4, Eurofins Agrosience Testing Pty Ltd, January 2015.

Results

PER 14282 - HAL/GLP/14/03 - DETERMINATION OF THE RESIDUES OF FLUAZIFOP-P-BUTYL IN WATER CHESTNUTS AND LOTUS ROOT – VG14039, PER14482

Study Phases		Dates
Study Commencement (Study Plan Signed)		18-Nov-2014
Field Phase (First Application to Final Sample)	Trial 140840 – Innisfail, Qld – Water Chestnut	5-Apr-2016 – 25-May-2016*
	Trial 140841 – Innisfail, Qld – Lotus Root	Cancelled^
	Trial 140840 (repeat) – Innisfail, Qld – Water Chestnut	26-Sep-2016 – 14-Nov-2016#
	Trial S14-05798-03 (repeat) – Toowoomba, Qld – Water Chestnut	14-Feb-2017 – 4-Apr-2017
Analytical Phase (First Sample Received to Analytical Report Signed)		30-Jun-2016 – 28-Jun-2017
Study Completion (Final Report Signed)		21-Jul-17
Permit Submission		21-Jul-17

* Original Trial was cancelled after analytical phase had been completed due to incorrect application rate used.

^ Lotus root trial was cancelled as a commercial grower was not located and in harvestable roots were produced from the crop grown.

#Repeat trial was cancelled prior to analytical phase as samples were misplaced and no reserve samples were available due to the limited crop area available.

Residues of fluazifop in water chestnut corms were 0.17, 0.019 and 0.11 mg/kg at zero days, 3 and 7 weeks after application respectively.

Recovery of fluazifop from fortified water chestnut corms was determined to be between 104% and 109%.

Full analytical results are presented below:

Residues Of Fluazifop-P-Butyl In Water Chestnuts Following Applications of a Registered Herbicide Product Containing 128 g/L Fluazifop-p-butyl, Trial S14-05798, Toowoomba, Qld

Sample Number	Application Rate	Commodity	Sampling Interval	Sampling Date	Fluazifop-p-butyl (As received) (mg/kg)
S14-05798-03-01	UTC	Corms	7 WALA	4-Apr-17	<LOD
S14-05798-03-02	3.3 L/ha	Corms	0 DALA	14-Feb-17	0.017
S14-05798-03-03	3.3 L/ha	Corms	3 WALA	7-Mar-17	0.019
S14-05798-03-04	3.3 L/ha	Corms	7 WALA	4-Apr-17	0.011

LOD = Limit of Detection = 0.003 mg/kg

LOQ = Limit of Quantitation = 0.01 mg/kg

Note: see Section 19.4.1 for further details

UTC = Untreated control

DALA = days after last application

WALA = weeks after last application

PER 14484 - HAL/GLP/14/05 - DETERMINATION OF THE RESIDUES OF FLUAZIFOP-P-BUTYL IN EGGPLANT AND SWEET POTATO – VG14039, PER14484

Study Phases		Dates
Study Commencement (Study Plan Signed)		19-Nov-2014
Field Phase (First Application to Final Sample)	Trial 140843 – Shepparton East, Vic - Eggplant	26-May-2015 – 23-Apr-2015
	Trial 140844 – Ayr, Qld - Eggplant	14-Jul-2015 – 10-Aug-2015
	Trial 140845 – Gatton, Qld – Sweet Potato	06-Feb-2015 – 17-Apr-2015
	Trial 140844 – Atherton, Qld – Sweet Potato	28-Jul-2015 – 7-Oct-2016
Analytical Phase (First Sample Received to Analytical Report Signed)		29-Apr-2015 – 19-Jan-2016
Study Completion (Final Report Signed)		25-Feb-2016
Permit Submission		21-Mar-16

Residues of fluazifop in eggplant fruit ranged from 0.018 and 0.17 mg/kg at 7 DAT, 0.013 to 0.12 mg/kg at 13-14 DAT, 0.014 to 0.085 mg/kg at 21-22 DAT, and <LOD to 0.037 mg/kg at 27-28 DAT.

Residues of fluazifop in sweet potato tubers ranged from 0.28 to 0.35 mg/kg at 5 WAT, 0.10 to 0.19 mg/kg at 7 WAT, and 0.047 to 0.092 mg/kg at 10 WAT.

Average recovery of fluazifop from fortified eggplant fruit and sweet potato tubers was determined to be between 90% and 96%.

Full analytical results are presented below:

Residues of Fluazifop in Eggplant Fruit Following Applications of a Registered Herbicide Product Containing 128 g/L Fluazifop-p-butyl, Trial 140843, Shepparton East, Victoria

Sample Number	Treatment	Commodity	Sampling Interval	Sampling Date	Fluazifop (as received) (mg/kg)
140843-1	Untreated	Whole Fruit	28 DAT	02-Apr-15	<LOD
140843-2	Fluazifop-p-butyl	Whole Fruit	7 DAT	02-Apr-15	0.17
140843-3	Fluazifop-p-butyl	Whole Fruit	14 DAT	09-Apr-15	0.12
140843-4	Fluazifop-p-butyl	Whole Fruit	21 DAT	16-Apr-15	0.085
140843-5	Fluazifop-p-butyl	Whole Fruit	28 DAT	23-Apr-15	0.037

LOD = Limit of Detection = 0.005 mg/kg

LOQ = Limit of Quantitation = 0.01 mg/kg

DAT = days after treatment

Residues of Fluazifop in Eggplant Fruit Following Applications of a Registered Herbicide Product Containing 128 g/L Fluazifop-p-butyl, Trial 140844, Ayr, Queensland

Sample Number	Treatment	Commodity	Sampling Interval	Sampling Date	Fluazifop (as received) (mg/kg)
140844-1	Untreated	Whole Fruit	27 DAT	10-Aug-15	<LOD
140844-2	Fluazifop-p-butyl	Whole Fruit	7 DAT	21-Jul-15	0.018
140844-3	Fluazifop-p-butyl	Whole Fruit	13 DAT	27-Jul-15	0.013
140844-4	Fluazifop-p-butyl	Whole Fruit	22 DAT	05-Aug-15	0.014
140844-5	Fluazifop-p-butyl	Whole Fruit	27 DAT	10-Aug-15	<LOD

LOD = Limit of Detection = 0.005 mg/kg

LOQ = Limit of Quantitation = 0.01 mg/kg

DAT = days after treatment

Residues of Fluazifop in Sweet Potato Tubers Following Applications of a Registered Herbicide Product Containing 128 g/L Fluazifop-p-butyl, Trial 140845, Gatton, Queensland

Sample Number	Treatment	Commodity	Sampling Interval	Sampling Date	Fluazifop (as received) (mg/kg)
140845-1	Untreated	Tubers	10 WAT	17-Apr-15	0.053
140845-2	Fluazifop-p-butyl	Tubers	5 WAT	12-Mar-15	0.35
140845-3	Fluazifop-p-butyl	Tubers	7 WAT	27-Mar-15	0.19
140845-4	Fluazifop-p-butyl	Tubers	10 WAT	17-Apr-15	0.047

LOD = Limit of Detection = 0.005 mg/kg

LOQ = Limit of Quantitation = 0.01 mg/kg

WAT = weeks after treatment

Residues of Fluazifop in Sweet Potato Tubers Following Applications of a Registered Herbicide Product Containing 128 g/L Fluazifop-p-butyl, Trial 140846, Atherton, Queensland

Sample Number	Treatment	Commodity	Sampling Interval	Sampling Date	Fluazifop (as received) (mg/kg)
140846-1	Untreated	Tubers	10 WAT	07-Oct-15	<LOD
140846-2	Fluazifop-p-butyl	Tubers	5 WAT	02-Sep-15	0.28
140846-3	Fluazifop-p-butyl	Tubers	7 WAT	16-Sep-15	0.10
140846-4	Fluazifop-p-butyl	Tubers	10 WAT	07-Oct-15	0.092

LOD = Limit of Detection = 0.005 mg/kg

LOQ = Limit of Quantitation = 0.01 mg/kg

WAT = weeks after treatment

PER 14494 - HAL/GLP/14/06 - DETERMINATION OF THE RESIDUES OF TRIFLOXYSTROBIN IN PROTECTED-STRUCTURE BABY SPINACH AND CHICORY – VG14039, PER14494

Study Phases		Dates
Study Commencement (Study Plan Signed)		18-Nov-2014
Field Phase (First Application to Final Sample)	Trial 140848 – Northern Adelaide Plains, SA – Baby Spinach (PC)	25-May-2015 – 22-Jun-2015
	Trial 140849 – Central Coast, NSW – Chicory (PC)	21-Jul-2015 – 18-Aug-2015
Analytical Phase (First Sample Received to Analytical Report Signed)		26-Aug-2015 – 8-Jan-2016
Study Completion (Final Report Signed)		15-Feb-2016
Permit Submission		2-Mar-16

Total residues of trifloxystrobin in baby spinach were 12.0 mg/kg at 0 DALA, 12.4 mg/kg at 1 DALA, 7.66 mg/kg at 3 DALA, 3.81 mg/kg at 7 DALA, and were 3.49 mg/kg at 14 DALA.

Total residues of trifloxystrobin in chicory were 7.16 mg/kg at 0 DALA, 6.97 mg/kg at 1 DALA, 6.67 mg/kg at 3 DALA, 5.63 mg/kg at 7 DALA, and were 0.77 mg/kg at 14 DALA.

Recovery of trifloxystrobin and its acid metabolite from fortified baby spinach and chicory foliage was determined to be 103% and 99%, respectively.

Full analytical results are presented below:

Residues of Trifloxystrobin in Baby Spinach Following Applications of a Registered Fungicide Product Containing 500 g/kg Trifloxystrobin, Trial 140848, Northern Adelaide Plains, SA

Sample Number	Treatment	Commodity	Sampling Interval	Sampling Date	Trifloxystrobin (mg/kg)	Trifloxystrobin Acid Metabolite (mg/kg)	Total Trifloxystrobin# (mg/kg)
140848-1	Untreated	Foliage	14 DALA	22-Jun-15	<LOD	<LOD	<LOD
140848-2	Trifloxystrobin	Foliage	0 DALA	08-Jun-15	12.0	0.016	12.0
140848-3	Trifloxystrobin	Foliage	1 DALA	09-Jun-15	12.3	0.057	12.4
140848-4	Trifloxystrobin	Foliage	3 DALA	11-Jun-15	7.58	0.071	7.66
140848-5	Trifloxystrobin	Foliage	7 DALA	15-Jun-15	3.77	0.048	3.81
140848-6	Trifloxystrobin	Foliage	14 DALA	22-Jun-15	3.40	0.087	3.49

LOD = Limit of Detection = 0.003 mg/kg for trifloxystrobin and its acid metabolite, and 0.006 mg/kg for total trifloxystrobin.

LOQ = Limit of Quantitation = 0.01 mg/kg for trifloxystrobin and its acid metabolite, and 0.02 mg/kg for total trifloxystrobin

Results of test samples are not corrected for recovery.

#Note: Total trifloxystrobin = trifloxystrobin + (trifloxystrobin acid metabolite x 1.036).

Note: trifloxystrobin acid metabolite was converted to equivalent trifloxystrobin concentration by using the ratio of molecular weight of trifloxystrobin to the molecular weight of trifloxystrobin acid metabolite i.e. ratio = $408.37/394.35 = 1.036$.

Residues of Trifloxystrobin in Chicory Following Applications of a Registered Fungicide Product Containing 500 g/kg Trifloxystrobin, Trial 140849, Central Coast, NSW

Sample Number	Treatment	Commodity	Sampling Interval	Sampling Date	Trifloxystrobin (mg/kg)	Trifloxystrobin Acid Metabolite (mg/kg)	Total Trifloxystrobin# (mg/kg)
140849-1	Untreated	Foliage	3 DALA	7-Aug-15	<LOD	<LOD	<LOD
140849-2	Trifloxystrobin	Foliage	0 DALA	4-Aug-15	7.08	0.083	7.16
140849-3	Trifloxystrobin	Foliage	1 DALA	5-Aug-15	6.89	0.081	6.97
140849-4	Trifloxystrobin	Foliage	3 DALA	7-Aug-15	6.58	0.081	6.67
140849-5	Trifloxystrobin	Foliage	7 DALA	11-Aug-15	5.55	0.072	5.63
140849-6	Trifloxystrobin	Foliage	14 DALA	18-Aug-15	0.73	0.042	0.77

LOD = Limit of Detection = 0.003 mg/kg for trifloxystrobin and its acid metabolite, and 0.006 mg/kg for total trifloxystrobin.

LOQ = Limit of Quantitation = 0.01 mg/kg for trifloxystrobin and its acid metabolite, and 0.02 mg/kg for total trifloxystrobin

Results of test samples are not corrected for recovery.

#Note: Total trifloxystrobin = trifloxystrobin + (trifloxystrobin acid metabolite x 1.036).

Note: trifloxystrobin acid metabolite was converted to equivalent trifloxystrobin concentration by using the ratio of molecular weight of trifloxystrobin to the molecular weight of trifloxystrobin acid metabolite i.e. ratio = $408.37/394.35 = 1.036$.

Outputs

For each of the three studies conducted from November 2014 through to July 2017, the following outputs were produced:

1. GLP compliant Study Plan
 - HAL/GLP/14/03
 - HAL/GLP/14/05,
 - HAL/GLP/14/06
2. GLP compliant analytical phase report by Eurofins Agrosience Testing
 - 14-0932 with 16-0804A as an addendum
 - 14-0933
 - 14-0934
3. GLP compliant Final Report
 - HAL/GLP/14/03-1
 - HAL/GLP/14/05-1
 - HAL/GLP/14/06-1
4. Permit applications with the following details:

Permit ID	Description	Applicant	Submission Date	APVMA Application Reference	APVMA Assessment Due Date
PER14484	Fluazifop-p-butyl (Fusilade Forte) / Various grass weeds / Eggplant, Shallots, Spring onions, Leeks, Garlic, Parsnips & Sweet potato. Expires: 31-Mar-18	Hort Innovation	21-Mar-16	DC21-97667595 Item 21 application containing GLP residue data #106058 (PER82556)	24-Jul-16 (Pending with the APVMA)
PER14494	Trifloxystrobin (Flint 500 WG) / Powdery Mildew, Cercospora & Septoria leaf spot / Celery, Silverbeet, Spinach, Chicory and Endive.	Hort Innovation	2-Mar-16	DC21-64321043 Item 21 application containing GLP residue data #105878	Permit Issued 28-Nov-16 and extended as PER14494 Version 2 until 31-Aug-22
PER14282 Now PER84740	Fluazifop-p-butyl. Various root vegetables (Taro, Rakkyo, Daikon, Brdock, Yam, Yam bean, Lotus root, water chestnuts, Galangal & Turmeric. Expires: 30-Apr-19	Hort Innovation	21-Jul-17	DC21-48948866 Item 21 application containing GLP residue data #111948	16-Feb-18

Outcomes

The key outcome of this project is the gaining of approval from the APVMA for use of the listed pesticide uses under APVMA minor use permits. A total of seven trials across three studies were conducted in the 2014-2017 seasons. Residue data has been generated for all trials within this project and all permits have been submitted for assessment by the APVMA.

It is anticipated that the proposed uses will not present any additional risks to either the environment or operator safety, provided users follow existing label statements with respect to personal protective equipment, environmental precautions and proper product storage and disposal.

Evaluation and Discussion

The approval by the APVMA of the minor-use permit applications, that have been submitted as part of this project, will aid vegetable growers by providing access to previously unavailable pesticide options for the control of various pests and diseases they encounter.

Residue data for the three residues studies, that are part of project VG14039, were reported in their respective final GLP reports which were reviewed by the Eurofins Agrosience Horticulture Leader and then submitted to and approved by the Hort Innovation R&D Manager.

Based on the residue data generated during this project the following recommendations were made to the APVMA:

PER 14282 – HAL/GLP/14/03:

On the basis of the residue data obtained and confirmation from APVMA that that use on lotus root can be extended with the current TMRL, it is requested that a permanent MRL of 3 mg/kg is established for lotus root, taro, water chestnut and yam bean and the current harvest withholding period of 7 weeks remains in place for this use-pattern.

PER 14484 - HAL/GLP/14/05:

On the basis of the residue data obtained, it requested the MRL for trifloxystrobin in baby spinach, chard (silverbeet), chicory leaves and endive be amended to 10 mg/kg. This is consistent with the current MRL for trifloxystrobin in beetroot leaves. It is requested the current harvest withholding period of 3 days remain in place.

PER 14494 - HAL/GLP/14/06

Data provided in this submission supports the current withholding period of 28 days (4 weeks) for eggplant with an MRL of 0.7 mg/kg and 10 weeks for sweet potato with an MRL of 0.3 mg/kg.

Recommendations

None to report

Intellectual Property/Commercialisation

No commercial IP generated.

Acknowledgements

The input and assistance of the following is gratefully acknowledged: Paul Hasenpusch, Amrit Pannu, Damian Bougoure, Sebastian Recabarren, Ben Baudinette, Tim Ranchodbhai, Bill Frost, Donna Lummis, Sara Pengelly, Simon Christen, Melita Shalders, Kathryn Adams, Lan Byrnes, Andrew Westcott and Nathalie Lalaurie.