EURL-PROFICIENCY TEST-FV-21, 2019

Pesticide Residues in Red Cabbage Homogenate

Final Report
2019

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EURL-EUROPEAN UNION PROFICIENCY TEST 21
FOR THE DETERMINATION OF PESTICIDES IN FRUITS AND VEGETABLES USING MULTIRESIDUE METHODS
2019

According to Article 28 of Regulation 396/2005/EC (23rd February 2005) of the European Parliament and of the Council, concerning maximum residue levels for pesticides in or on food and feed of plant and animal origin[1], all laboratories analysing samples for the official control of pesticide residues shall participate in the European Union Proficiency Tests (EUPTs) for pesticide residues organised by the European Union. These proficiency tests are carried out on an annual basis in order to continuously improve the quality, accuracy and comparability of the residue data reported by EU Member States to the European Union, as well as by other Member States, within the framework of the EU multi-annual coordinated control programme and national monitoring programmes.

Regulation (EU) 2017/625[2] lays down the general tasks, duties and requirements for European Union Reference Laboratories (EURLs)[3] for Food, Feed and Animal Health. Among these tasks is the provision for independently organised comparative tests. European Proficiency Test FV-21 has been organised by the EURL in Fruits and Vegetables at the University of Almería, Spain[4].

Participation in European Proficiency Test FV-21 was mandatory for all National Reference Laboratories (NRLs), as well as all other EU official laboratories, involved in the determination of pesticide residues in fruits and vegetables for the EU multi-annual coordinated control programme or for their own national monitoring programmes. Additionally, laboratories from China, Colombia, Costa Rica, Kenya, Peru, Saudi Arabia, Serbia, Singapore, Thailand, Turkey and Uruguay participated in this test.

DG-SANTE will have full access to all data from the EUPTs including the lab-code/lab-name key. The NRLs will also have that information for the OfLs within their network. This report may be presented to the European Union Standing Committee on Plants, Animals, Food and Feed (PAFF).

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[1] Regulation (EC) No 396/2005, published in the OJ of the EU L70 on 16.03.2005, last amended by Regulation 839/2008 published in the OJ of the EU L234 on 30.08.2008.

[2] Regulation (EU) 2017/625 of the European Parliament and of the Council on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products. Published in the OJ of the EU L95 on 07.04.2017.

[3] The Community Reference Laboratory (CRL) changed its name to the European Union Reference Laboratory (EURL) on 1st December 2009 as a result of the Treaty of Lisbon. OJ of the EU C306 on 17.12.2007.

[4] Commission Regulation (EC) No 776/2006 of 23rd May 2006 - amending Annex VII to Regulation (EC) No 882/2004 of the European Parliament and of the Council as regards European Union Reference Laboratories.

1. INTRODUCTION

One hundred and ninety laboratories agreed to participate in EUPT-FV21.

The proficiency test was performed in 2019 using red cabbage homogenate. The red cabbages were cultivated in a greenhouse in Almería, Spain, and were treated before harvest using commercial formulations applied by spraying with conventional diffusors. After harvest, they were also treated with analytical standards. Seventeen mandatory pesticides and three voluntary ones were used for the treatment. Participating laboratories were also provided with a 'blank' red cabbage homogenate as well as the treated red cabbage test item.

The test items, 200 g of red cabbage homogenate containing pesticide residues, together with 200 g of 'blank' red cabbage homogenate, were shipped to participants on 25th February 2019. The deadline for results submission to the Organiser was 25th March 2019. The participants were asked to determine the residue levels of all the pesticides that they detected and to report the concentrations in mg/kg. The participants were provided with two target pesticide lists, one with pesticides that had to be analysed on a compulsory basis, and a second one with pesticides to be analysed voluntarily. The compulsory list contained 205 target pesticides. The pesticide target list is detailed in Annex A together with the voluntary target list, which contained 32 pesticides. The lists of target pesticides also contained the MRRL for each pesticide fixed at 0.01 mg/kg, except for the following pesticides which have lower MRRLs based on Regulation (EU) No. 396/2005 and EU Directive 2006/125/EC, or for which EFSA requested lower LOQs: aldrin (0.005 mg/kg), cadusafos (0.005 mg/kg), demeton-S-methylsulfone (0.005 mg/kg), diazinon (0.005 mg/kg), dichlorvos (0.005 mg/kg), dieldrin (0.005 mg/kg), dimethoate (0.003 mg/kg), ethoprophos (0.005 mg/kg), fipronil (0.004 mg/kg), fipronil sulfone (0.004 mg/kg) and omethoate (0.003 mg/kg).

Participants were asked to analyse the blank test item and report results for any of the pesticides they found which were included in the target lists. This 'blank' material was intended to be used for recovery experiments with the pesticides detected in the treated test item and, if necessary, for the preparation of matrix-matched calibration standard solutions.

The robust mean values of the analytical data submitted were used to obtain the assigned (true) values for each of the pesticide residues present. A fit-for-purpose relative target standard deviation (FFP-RSD) of 25 % was chosen to calculate the target standard deviations (σ) as well as the z scores for the individual pesticides.

For the assessment of overall laboratory performance, the Average of the squared z scores (AZ^2) was used. Laboratories that had 'sufficient scope' and were able to analyse at least 90 % of the compulsory pesticides in the target pesticides list, had correctly detected and quantified a sufficiently high percentage of the pesticides present in the Test Item (at least 90 %) and reported no false positives, were classified into Category A. Within this category, the laboratories were also subclassified as 'good', 'satisfactory' or 'unsatisfactory', in relation to the overall accuracy of the results that they reported.

All the other laboratories were classified into Category B. For laboratories in Category B, individual z scores were calculated but the overall accuracy of their results was not assessed.

Laboratories that did not report results have not been classified into any category and are listed in Annex B with the remainder of laboratories that participated in EUPT-FV-21.

2. TEST ITEMS

2.1 Preparation of the treated test item

The red cabbages were cultivated in a greenhouse in Almería, Spain, and were treated before harvest using commercial formulations applied by spraying with conventional diffusors. Additionally, they were post-harvest treated using analytical standards. The pesticides used as commercial formulations were acetamiprid, chlorantraniliprole, difenoconazole, dimethoate, metaflumizone, penthiopyrad, propamocarb and trifloxystrobin. The pesticides spiked as analytical standards were chlorpropham, chlorpyrifos, chlothianidin, diazinon, fenamidone, fluxapyroxad, propyzamide, pyraclostrobin, spinetoram, teflubenzuron, triflumuron and tritosufuron.

Before preparation of the test item, the pesticides and target residue levels were selected, following recommendations made by the QCG, which had been appointed specifically for EUPT-FV-21. Approximately 300 m^2 of red cabbage plants were treated with commercial formulations, which were dissolved in water. One day after the application, a representative sample of the treated red cabbage was collected and analysed to check if the residue levels present were close to the target levels. As the residue levels in the red cabbage were low for six pesticides, the treatment in the field was repeated. One week after the first treatment, 125 kg of the treated red cabbages were harvested and spiked post-harvest with analytical standards dissolved in ethyl acetate. Afterwards, the material was frozen and processed using liquid nitrogen and a mincer. The frozen minced red cabbages were mixed in a constantly spinning container until a homogeneous material was obtained. 200 g portions of the well-mixed homogenate were weighed out into screw-capped polyethylene plastic bottles, sealed and stored in a freezer at about - 20 °C prior to distribution to participants.

2.2 Preparation of 'blank' test item

The red cabbage plants used for the production of the blank test item were grown in the same greenhouse as the test item. Before the treatment of the red cabbage, 100 kg were harvested in order to be used in the preparation of the blank test items. The blank homogenate was prepared in the same way as the treated test item described previously.

2.3 Homogeneity test

The homogeneity and stability tests were subcontracted to the laboratory Eurofins-SICA AgriQ S.L. (accredited under ISO/IEC 17025 by the Spanish accreditation body, ENAC) after evaluation by the organisation of the PT. Ten bottles of the treated test item were randomly chosen from those stored in the freezer and analyses were performed on duplicate portions taken from each bottle.

The injection sequence of the 20 extracts that were analysed by GC and LC was also randomly chosen. The quantification by GC-MS/MS and LC-MS/MS was performed using calibration curves constructed from procedural standard calibration prepared from the 'blank' red cabbage test item.

The statistical evaluation was performed according to the International Harmonized Protocol published by IUPAC, ISO and AOAC [1]. The individual residues data from the homogeneity tests are given in Appendix 1. The results of the statistical analyses are given in Table 2.1. The acceptance criteria for the test item to be sufficiently homogenous for the proficiency test were that: $Ss^2 < c$, where Ss is the between-bottle sampling standard deviation and $c = F_1\sigma^2_{all} + F_2S^2_{an}$; F_1 and F_2 being constant values of 1.88 and 1.01, respectively, from the ten samples taken, and σ^2_{all} = (0.3 x FFP-RSD(25 %) x mean concentration)^2. This was used to demonstrate that the between-bottle variance was not higher than the within-bottle variance.

Table 2.1 Statistical evaluation of the homogeneity test data (n = 20 analyses)

Pesticide	Mean Conc. (mg/Kg)	Ss^2	c	$Ss^2 < c$ Pass/Fail
Acetamiprid	0.185	0	4.0E-4	Pass
Chlorantraniprole	0.137	2.2E-6	2.2E-4	Pass
Chlorpyrifos	0.056	9.8E-7	4.1E-5	Pass
Chlorpropham	0.086	1.9E-5	9.2E-5	Pass
Chlothianidin	0.058	9.6E-7	4.4E-5	Pass
Diazinon	0.092	1.7E-5	1.0E-4	Pass
Difenoconazole	0.184	8.5E-5	4.1E-4	Pass
Dimethoate	0.141	1.1E-5	2.2E-4	Pass
Fenamidone	0.603	5.3E-5	4.2E-3	Pass
Fluxapyroxad	0.572	6.9E-5	3.6E-3	Pass
Metaflumizone	0.210	5.7E-5	5.0E-4	Pass
Omethoate ⓘ	0.009	1.1E-8	0	Pass
Pyraclostrobin	0.075	1.0E-6	6.4E-5	Pass
Propamocarb	0.189	1.2E-5	4.1E-4	Pass
Propyzamide	0.100	1.8E-5	1.2E-4	Pass
Teflubenzuron	0.433	1.8E-4	2.7E-3	Pass
Trifloxystrobin	0.257	0	8.3E-4	Pass
Triflumuron	0.478	3.6E-5	2.6E-3	Pass
Voluntary Pesticides				
Penthiopyrad*	0.263	1.6E-5	7.9E-4	Pass
Spinetoram*	0.118	1.5E-6	4.0E-5	Pass
Tritosulfuron*	0.077	1.1E-6	6.7E-5	Pass

S_s: Between-Sampling Standard Deviation
ⓘOnly for informative purposes
*Compound out of the ENAC accredited scope of the subcontracted laboratory

As can be seen from Table 2.1, all the pesticides evaluated in the red cabbage matrix passed the homogeneity test.

2.4 Stability tests

The stability tests were also subcontracted to the laboratory Eurofins-SICA AgriQ S.L. (accredited under ISO/IEC 17025 by the Spanish accreditation body, ENAC) after evaluation by the

organisation of the PT. The tests were performed according to ISO 13528:2015, Annex B [2]. Shortly before the test item shipment, three bottles that were stored in the freezer at -20 °C were chosen randomly and stored in a -80 °C freezer (Day 1). Shortly after the deadline for reporting results, those three bottles stored at -80 °C, together with three other bottles that were stored in the freezer at -20 °C and were chosen randomly (Day 2) were analysed by duplicate.

A pesticide was considered to be adequately stable if $|x_1 - y_i| \leq 0.3 \times \sigma$, where x_1 is the mean value of the Day 1 stability test, yi the mean value of the Day 2 stability test and σ the standard deviation used for proficiency assessment (typically 25 % of the assigned value).

The individual results are given in Table 2.2. This test did not show any significant decrease in the pesticide concentrations with time. This demonstrates that, for the duration of the proficiency test, and provided that the storage conditions prescribed were followed, the time elapsed until the participants performed the analysis would not have influenced their results.

Moreover, regarding the stability of the sample arriving not completely frozen, a duplicate analysis of three bottles reproducing the delivery conditions that the samples experienced for 48 hours was performed (Day 3). Laboratories could therefore be sufficiently confident in accepting the treated test item even if it was not completely frozen. All the pesticides passed this second stability test. Results for this 48-hour stability test are indicated in Table 2.3.

Table 2.2 Statistical test for analytical precision and to demonstrate results stability after the interval of time-elapse between the shipment of the test item and the deadline for reporting of results.

(mg/Kg)	Day 1							Day 2							(M2 – M1)	M2-M1 ≤ 0.3*σ
	Sample 173_A	Sample 173_B	Sample 177_A	Sample 177_B	Sample 217_A	Sample 217_B	Mean 1	Sample 146_A	Sample 146_B	Sample 180_A	Sample 180_B	Sample 215_A	Sample 215_B	Mean2		
Acetamiprid	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,000	Pass
Chlorantraniliprole	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,000	Pass
Chlorpropham	0,096	0,100	0,096	0,100	0,096	0,100	0,098	0,100	0,100	0,094	0,100	0,100	0,098	0,099	0,001	Pass
Chlorpyrifos	0,050	0,052	0,050	0,055	0,052	0,055	0,052	0,053	0,053	0,049	0,054	0,051	0,051	0,052	-0,001	Pass
Clothianidin	0,062	0,062	0,061	0,064	0,062	0,063	0,062	0,065	0,063	0,061	0,062	0,062	0,061	0,062	0,000	Pass
Diazinon	0,080	0,086	0,082	0,089	0,082	0,089	0,085	0,089	0,090	0,080	0,085	0,084	0,085	0,086	0,001	Pass
Difenoconazole	0,170	0,180	0,180	0,200	0,180	0,200	0,185	0,170	0,170	0,180	0,180	0,180	0,180	0,177	-0,008	Pass
Dimethoate	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,000	Pass
Fenamidone	0,620	0,620	0,630	0,610	0,610	0,620	0,618	0,630	0,640	0,630	0,620	0,610	0,620	0,625	0,007	Pass
Fluxapyroxad	0,590	0,580	0,590	0,580	0,590	0,580	0,585	0,580	0,590	0,580	0,590	0,590	0,580	0,585	0,000	Pass
Metaflumizone	0,220	0,220	0,220	0,220	0,210	0,220	0,218	0,220	0,210	0,220	0,220	0,220	0,220	0,218	0,000	Pass
Omethoate ⓘ	0,008	0,008	0,008	0,008	0,007	0,007	0,008	0,008	0,008	0,008	0,008	0,008	0,008	0,008	0,000	Pass
Propamocarb	0,190	0,190	0,180	0,190	0,190	0,190	0,188	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,002	Pass
Propyzamide	0,088	0,094	0,089	0,094	0,090	0,096	0,092	0,098	0,097	0,086	0,093	0,094	0,090	0,093	0,001	Pass
Pyraclostrobin	0,083	0,085	0,086	0,086	0,086	0,085	0,085	0,087	0,085	0,081	0,082	0,084	0,083	0,084	-0,001	Pass
Teflubenzuron	0,097	0,100	0,099	0,110	0,097	0,100	0,101	0,120	0,120	0,093	0,110	0,100	0,100	0,107	0,007	Pass
Trifloxystrobin	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,000	Pass
Triflumuron	0,480	0,480	0,480	0,480	0,480	0,480	0,480	0,480	0,470	0,480	0,480	0,480	0,480	0,478	-0,002	Pass

(mg/Kg)	Day 1							Day 2							(M2 – M1)	M2-M1 ≤ 0.3*σ
	Sample 173_A	Sample 173_B	Sample 177_A	Sample 177_B	Sample 217_A	Sample 217_B	Mean 1	Sample 146_A	Sample 146_B	Sample 180_A	Sample 180_B	Sample 215_A	Sample 215_B	Mean2		
Voluntary Pesticides																
Penthiopyrad*	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,270	0,260	0,260	0,260	0,270	0,270	0,265	0,005	Pass
Spinetoram*	0,065	0,065	0,062	0,063	0,063	0,063	0,064	0,063	0,061	0,060	0,062	0,064	0,063	0,062	-0,001	Pass
Tritosulfuron*	0,086	0,085	0,083	0,085	0,085	0,085	0,085	0,087	0,088	0,080	0,081	0,083	0,084	0,084	-0,001	Pass

ⓘOnly for informative purposes
**Compound out of the ENAC accredited scope of the subcontracted laboratory

Table 2.3 Statistical test for analytical precision and to demonstrate stability for the 48-hour time-elapse interval.

(mg/Kg)	Day 1							Day 3							(M3 – M1)	M3-M1 ≤ 0.3*σ
	Sample 173_A	Sample 173_B	Sample 177_A	Sample 177_B	Sample 217_A	Sample 217_B	Mean 1	Sample 135_A	Sample 135_B	Sample 152_A	Sample 152_B	Sample 195_A	Sample 195_B	Mean3		
Acetamiprid	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,000	Pass
Chlorantraniliprole	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,000	Pass
Chlorpropham	0,096	0,100	0,096	0,100	0,096	0,100	0,098	0,097	0,100	0,095	0,094	0,093	0,096	0,096	-0,002	Pass
Chlorpyrifos	0,050	0,052	0,050	0,055	0,052	0,055	0,052	0,048	0,051	0,049	0,048	0,051	0,051	0,050	-0,003	Pass
Clothianidin	0,062	0,062	0,061	0,064	0,062	0,063	0,062	0,064	0,064	0,063	0,065	0,063	0,063	0,064	0,001	Pass
Diazinon	0,080	0,086	0,082	0,089	0,082	0,089	0,085	0,087	0,087	0,079	0,080	0,082	0,084	0,083	-0,001	Pass
Difenoconazole	0,170	0,180	0,180	0,200	0,180	0,200	0,185	0,180	0,140	0,180	0,180	0,180	0,210	0,178	-0,007	Pass
Dimethoate	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,000	Pass
Fenamidone	0,620	0,620	0,630	0,610	0,610	0,620	0,618	0,630	0,640	0,640	0,630	0,620	0,610	0,628	0,010	Pass
Fluxapyroxad	0,590	0,580	0,590	0,580	0,590	0,580	0,585	0,590	0,590	0,590	0,590	0,570	0,580	0,585	0,000	Pass
Metaflumizone	0,220	0,220	0,220	0,220	0,210	0,220	0,218	0,220	0,220	0,220	0,220	0,220	0,210	0,218	0,000	Pass
Omethoateⓘ	0,008	0,008	0,008	0,008	0,007	0,007	0,008	0,008	0,008	0,008	0,008	0,007	0,008	0,008	0,000	Pass
Propamocarb	0,190	0,190	0,180	0,190	0,190	0,190	0,188	0,190	0,190	0,190	0,190	0,190	0,190	0,190	0,002	Pass
Propyzamide	0,088	0,094	0,089	0,094	0,090	0,096	0,092	0,091	0,096	0,089	0,087	0,091	0,091	0,091	-0,001	Pass
Pyraclostrobin	0,083	0,085	0,086	0,086	0,086	0,085	0,085	0,084	0,085	0,084	0,086	0,084	0,085	0,085	0,000	Pass
Teflubenzuron	0,097	0,100	0,099	0,110	0,097	0,100	0,101	0,100	0,110	0,067	0,095	0,110	0,100	0,097	-0,004	Pass
Trifloxystrobin	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,270	0,260	0,270	0,260	0,260	0,263	0,003	Pass
Triflumuron	0,480	0,480	0,480	0,480	0,480	0,480	0,480	0,470	0,460	0,480	0,490	0,480	0,490	0,478	-0,002	Pass
Voluntary Pesticides																
Penthiopyrad*	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,260	0,000	Pass
Spinetoram*	0,065	0,065	0,062	0,063	0,063	0,063	0,064	0,060	0,060	0,063	0,063	0,062	0,061	0,062	-0,002	Pass
Tritosulfuron*	0,086	0,085	0,083	0,085	0,085	0,085	0,085	0,085	0,085	0,083	0,086	0,083	0,086	0,085	0,000	Pass

ⓘOnly for informative purposes
*Compound out of the ENAC accredited scope of the subcontracted laboratory

2.5 Distribution of test items and protocol to participants

One bottle of frozen treated test item and one bottle of frozen 'blank' material were shipped to each participant in boxes containing dry ice. The test items were sent out on 25th February 2019. Ninety-seven percent of the shipments to EU/EFTA countries arrived within the first 48 hours.

Before sample shipment, the laboratories received full instructions (Annex A) for the receipt and storage of the test items and they were encouraged to use their normal sample receipt procedure and method(s) of analysis. These instructions were uploaded onto the open site of the EURL-FV webpage as part of the Specific Protocol. The Application Form was also available as an on-line form. After applying for the test, each participant laboratory received their Lab Code and password, thus allowing them to participate. This ensured that confidentiality was maintained throughout the duration of Proficiency Test 21. The Target Pesticide List and the Minimum Required Reporting Levels (MRRLs), as established by the Advisory Group, were uploaded onto the EURL-FV open website at least three months before the shipment of the test item to allow laboratories enough time to purchase standards and to validate their methods.

3. STATISTICAL METHODS

3.1 False positives and negatives

3.1.1 False positives

These are results of pesticides from the Target Pesticides List, that are reported at, or above, their respective MRRLs although they were: (i) not detected by the Organiser, even after repeated analyses, and/or (ii) not detected by the overwhelming majority (e.g. > 95 %) of the participating laboratories that had targeted the specific pesticides. In certain instances, case-by-case decisions by the EUPT-Panel may be necessary.

Any results reported lower than the MRRL will not be considered as false positives, even though these results should not have been reported.

No z score values have been calculated for false positive results. Any laboratory reporting a false positive, even when reporting the necessary number of pesticides to obtain sufficient scope, has been classified into Category B.

3.1.2 False negatives

These are results for pesticides reported by the laboratories as 'analysed' but without reporting numerical values although they were: a) used by the Organiser to treat the Test Item and b) detected by the Organiser as well as the majority of the participants that had targeted these specific pesticides at or above the respective MRRLs. Results reported as '< RL' (RL= Reporting Limit of the laboratory) will be considered as not detected and will be judged as false negatives. In certain instances, case-by-case decisions by the EUPT-Panel may be necessary.

In cases of the assigned value being less than a factor of 3 times the MRRL, false negatives will typically not be assigned. The EUPT-Panel may decide to take case-by-case decisions in this respect after considering all relevant factors such as the result distribution and the reporting limits of the affected labs.

Z scores have also been calculated for false negatives. However, these z scores were not taken into account in assessing the 90 %, or more, of pesticides present in the sample needed to be classified into Category A.

3.2 Estimation of the assigned values (x_{pt})

In order to minimise the influence of out-lying results on the statistical evaluation, the assigned value (= consensus concentration) was estimated using robust statistics as described in ISO 13528:2015, considering the results reported by EU and EFTA countries laboratories only. Individual results without any numerical values reported, such as detected (D), were not considered. The spread of results for each pesticide was tested for multimodality. In special justifiable cases, the EUPT-Panel may decide to eliminate certain results traceably associated with gross errors or to use only the results of a subgroup consisting of laboratories that have repeatedly demonstrated good performance for the specific compound in the past.

Considering the normative for robust analysis in ISO 13528:2015, the uncertainty accompanying the assigned value for each pesticide was calculated according to the following equation:

$$u(x_{pt}) = 1.25\frac{s^*}{\sqrt{\mathrm{p}}}$$

Where:

- $u(x_{pt})$ is the uncertainty in mg/Kg.
- s^* is the robust standard deviation of the results.
- p is the total number of results.

3.3 Fixed target standard deviations

Based on the experience gained from previous EU proficiency tests and recommendations from the EURL Advisory Group, a fixed relative standard deviation (FFP-RSD) of 25 % was chosen [3]. This is in line with the internationally accepted target Measurement Uncertainty of 50 % for multiresidue analysis of pesticides [4], which is derived from, and linked to, the EUPTs. The same target RSD has been applied to all the pesticides, independent of concentration. For informative purposes the robust relative standard deviation (CVs*) is calculated according to ISO 13528:2015 Chapter 7.7 (Consensus value from participant results) following Algorithm A in Annex C, and it can be compared to the FFP-RSD in Table 4.4.

3.4 z scores

A z score for each laboratory/pesticide combination was calculated according to the following equation:

$$z_i = \frac{(x_i - x_{pt})}{\sigma_{\mathrm{pt}}}$$

Where:

- x_i is the result reported by the participant, or the MRRL or the reporting limit (RL) (whichever one is lower) for those labs that have not detected the presence of the pesticide in the sample.
- X_{pt} is the assigned value.
- σ_{pt} is the target standard deviation (the FFP-RSD of 25 % multiplied by the assigned value).

z score classification is as follows:

$\|z\| \leq 2.0$	Acceptable
$2.0 < \|z\| < 3.0$	Questionable
$\|z\| \geq 3.0$	Unacceptable

- Any z score value of $|z| > 5$ has been reported as '>5' and a value of '5' has been used to calculate combined z scores.
- No z score calculations have been performed for false positive results.
- For false negative results, the MRRL (or RL) has been used to calculate the z score. These z scores have also been included in the graphical representation and are marked with an asterisk.

3.5 Combined z scores

In order to evaluate each laboratory's overall performance according to the quality of its results and its scope, two classifications - Category A and B - were used. To be classified into Category A, laboratories had to be able to analyse at least 90 % of the compulsory pesticides in the target pesticides list, to correctly identify and report quantitative results (that is *sought and detected*) for 90 % or more of the total number of pesticides evaluated in the test item and report no false positives (for the 90 % criterion the number of pesticides needed to be correctly analysed to have sufficient scope will be calculated by multiplying the number of compulsory pesticides from the Target Pesticides List by 0.9 and rounded to the nearest full number with 0.5 decimals being rounded downwards). If these three requirements were met, then the combined z scores were calculated as the 'Average of the Squared z scores' (AZ^2) [5].

3.5.1 The Average of the Squared z scores (AZ^2)

The 'Average of the Squared z scores' was introduced for the first time in EUPT-FV12. The AZ^2 is calculated as follows:

$$AZ^2 = \frac{\sum_{i=1}^{n} Z_i^2}{n}$$

The resultant formula is the sum of the z scores value, multiplied by itself and divided by the number of z scores (n) detected by each laboratory, including those from false negatives.

This formula is subsequently used to produce an overall classification of laboratories with three sub-classifications: 'good', 'satisfactory' and 'unsatisfactory'.

$$|AZ^2| \leq 2.0 \quad \text{Good}$$
$$2.0 < |AZ^2| < 3.0 \quad \text{Satisfactory}$$
$$|AZ^2| \geq 3.0 \quad \text{Unsatisfactory}$$

In this way, a simple, single, combined value is also achieved, as with the previous formula. However, this time, it is more mathematically justifiable as it uses the actual z score value rather than the factors 1, 3 and 5. Again, the aim is to encourage laboratories to not only improve the accuracy of their results but also to analyse a greater number of pesticides.

Laboratories that did not detect and quantify sufficient pesticides, that were not able to analyse at least 90 % of the compulsory pesticides or reported a false positive, have been placed in Category B and no combined z score has been calculated.
In Appendices 5 and 6, only results of laboratories in Category A have been presented, along with their graphical representations.

4. RESULTS

4.1 Summary of reported results

The laboratories that agreed to participate are listed in Annex B. All results reported by the participants are given in Appendix 3, whilst the analytical methods used are given in Appendix 7 (available in the EURL-FV web page in electronic format).

One hundred and ninety laboratories agreed to participate in this proficiency test. One cancelled its participation, so the total number of laboratories submitting results was 189. The results reported by all the laboratories are presented in this report. However, only results reported by laboratories from EU-countries and EFTA-countries (Iceland, Norway, and Switzerland) have been included in the statistical treatment. The results from the laboratories in China, Colombia, Costa Rica, Kenya, Peru, Saudi Arabia, Serbia, Singapore, Thailand, Turkey and Uruguay have not been included. This last group totals 17 laboratories that reported results.

Seventeen pesticides from the compulsory pesticide target list and three voluntary pesticides were used to treat the sample. Additionally, omethoate was present in the test item, due to the treatment of the red cabbage plants with dimethoate. However, as the assigned value for omethoate was 0.008 mg/kg, which is below three times omethoate´s MRRL (0.003 mg/kg), the SC agreed that it should not be considered for the evaluation of the participants. Information for omethoate will be displayed only for informative purposes.
A summary of the reported results for the pesticides evaluated can be seen below in Table 4.1.

Table 4.1 Summary of Reported Results

Pesticides	No. of Reported Results	No. of False Negative Results	No. of Not Analysed Results	Percentage of Reported Results[a] (out of 172)
Acetamiprid	154	3	15	89
Chlorantraniliprole	139	5	28	80
Chlorpropham	159	4	9	92
Chlorpyrifos	168	1	3	97
Clothianidin	149	4	19	86
Diazinon	166	0	6	96
Difenoconazole	166	3	3	96
Dimethoate	166	0	6	96
Fenamidone	156	4	12	90
Fluxapyroxad	110	5	57	64
Metaflumizone (sum of E- and Z- isomers)	119	6	47	69
Omethoateⓘ	122	36	14	71
Propamocarb (only parent compound)	146	4	22	84
Propyzamide	158	1	13	91
Pyraclostrobin	154	4	14	89
Teflubenzuron	131	6	35	76
Trifloxystrobin	162	2	8	94
Triflumuron	137	5	30	79
Voluntary Pesticides				
Spinetoram	86	8	78	50
Penthiopyrad	87	9	76	50
Tritosulfuron	44	15	113	25

[a] The percentage of Reported Results comes from 172 laboratories. It does not take into account the seventeen laboratories from China, Colombia, Costa Rica, Kenya, Peru, Saudi Arabia, Serbia, Singapore, Thailand, Turkey and Uruguay.
ⓘ Only for informative purposes.

4.1.1 False positives

Six laboratories (including non-EU countries) reported results for additional pesticides that were not present in the test item. These pesticides and the residue levels reported are presented in Table 4.4, together with the MRRLs and reporting limits (RLs). Where the reported concentrations of the erroneously detected pesticide were higher than the assigned MRRL value in the Target Pesticide List (Annex A), the result has been considered as a false positive. If the concentrations reported were below the MRRLs, or if the pesticides did not appear in the pesticide list included in Annex A, then they were not considered to be false positives. Two laboratories reported results for benalaxyl, which is included in the Voluntary Target List. Although the result is considered as a false positive of a voluntary compound, it will not be considered for categorisation into Category A/B.

Table 4.4 Laboratories that reported as quantitative results for pesticides that were not present in the treated test item

Laboratory Code	Pesticide	Concentration (mg/kg)	Determination Technique	RL (mg/kg)	MRRL (mg/kg)
716§	Chlorfenapyr	0.14	LC-MS/MS QQQ	0.01	0.01
868	Chlorpyrifos-methyl	0.05	GC-MS/MS (QQQ)	0.01	0.01
758	Diflubenzuron	0.038	GC-MS/MS (QQQ)	0.01	0.01
884§	Diflubenzuron	0.064	GC-MS	0.01	0.01
882	Diphenylamine	0.0136	LC-MS/MS QQQ	0.01	0.01
722§	Fluopicolide	0.137	GC- (μ) ECD	0.01	0.01
Voluntary Pesticides					
608	Benalaxyl	0.048	GC-MS/MS (QQQ)	0.01	0.01
786	Benalaxyl	0.0159	GC-MS/MS (QQQ)	0.01	0.01

§ Non-EU/EFTA laboratories

4.1.2 False negatives

Table 4.5 summarises the results from laboratories (including non-EU laboratories, indicated with §) that reported false negatives, presented as 'Not Detected' (ND).

Table 4.5 Laboratories that failed to report pesticides that were present in the treated test item.

Laboratory Code	Acetamiprid	Chlorantraniliprole	Chlorpropham	Chlorpyrifos	Clothianidin	Difenoconazole	Fenamidone	Fluxapyroxad	Metaflumizone	Propamocarb	Propyzamide	Pyraclostrobin	Teflubenzuron	Trifloxystrobin	Triflumuron
532													ND		
550								ND	ND						
576		ND				ND							ND	ND	ND
598															ND
600		ND							ND	ND					
628															ND
668									ND				ND		
680			ND												
694§													ND		
696	ND														
706								ND							
714§			ND												
724												ND			
736			ND												
738	ND				ND				ND			ND			
772							ND								
814		ND											ND		ND
868				ND											

Laboratory Code	Acetamiprid	Chlorantraniliprole	Chlorpropham	Chlorpyrifos	Clothianidin	Difenoconazole	Fenamidone	Fluxapyroxad	Metaflumizone	Propamocarb	Propyzamide	Pyraclostrobin	Teflubenzuron	Trifloxystrobin	Triflumuron
878										ND					
886[§]			ND												ND
890[§]	ND		ND		ND		ND	ND	ND	ND	ND		ND		ND
892								ND							
896	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
912					ND										
914							ND								
930[§]									ND						
1116		ND	ND		ND	ND	ND	ND	ND	ND		ND	ND		

Voluntary Pesticides			
Lab code	**Penthiopyrad**	**Spinetoram**	**Tritosulfuron**
532			ND
558	ND	ND	ND
576		ND	
582		ND	
594			ND
614		ND	
666			ND
678			ND
730			ND
734			ND
756	ND		
758	ND	ND	ND
766		ND	
800			ND
802	ND		
810			ND
824[§]			ND
838			ND
844			ND
882	ND		
884[§]		ND	
890[§]	ND	ND	ND
892	ND		ND
896	ND	ND	ND
908	ND		
1116	ND	ND	ND

[§] Non-EU/EFTA laboratories
ND: Not detected

4.1.3 Distribution of data

The distribution of the concentrations of the pesticides reported by the laboratories has been plotted as histograms with a bandwidth of $0.75 \cdot \sigma$ (σ is the target standard deviation (the FFP-RSD of 25 % multiplied by the assigned value) after removing outliers, if necessary. The histograms of

both the compulsory and voluntary pesticides present in the test item are presented in Appendix 2.

4.2 Assigned values and target standard deviations

The assigned values are based on the robust mean values calculated using all the results reported by laboratories from EU and EFTA countries. The assigned values for the seventeen compulsory and the two voluntary pesticides and their uncertainties are presented in Table 4.6.

The target standard deviation was calculated using a fixed FFP-RSD value of 25 %. For comparison, a robust standard deviation (CV*) was also calculated for informative purposes, employing also this value for the calculation of the uncertainty. These RSDs can be seen in Table 4.4.
The assigned value for omethoate was 0.008 mg/kg, which is below three times omethoate´s MRRL (0.003 mg/kg). For this reason, the SC agreed that it should not be considered for the evaluation of the participants. Information for omethoate is displayed only for informative purposes.

Table 4.6 Robust mean values. uncertainty and % RSDs for all pesticides evaluated.

Pesticides	MRRL (mg/kg)	Robust mean (mg/kg)	Uncertainty (mg/kg)	Number of results (n)	FFP-RSD (%)	CV* (%)
Acetamiprid	0.01	0.174	0.002	154	25.0	13.0
Chlorantraniliprole	0.01	0.136	0.002	139	25.0	15.2
Chlorpropham	0.01	0.084	0.001	159	25.0	14.0
Chlorpyrifos	0.01	0.051	0.001	168	25.0	17.6
Clothianidin	0.01	0.052	0.001	149	25.0	15.5
Diazinon	0.005	0.077	0.001	166	25.0	15.3
Difenoconazole	0.01	0.169	0.003	165	25.0	17.1
Dimethoate	0.003	0.124	0.002	166	25.0	13.0
Fenamidone	0.01	0.615	0.009	156	25.0	15.2
Fluxapyroxad	0.01	0.536	0.008	110	25.0	12.4
Metaflumizone	0.01	0.210	0.006	119	25.0	23.6
Omethoate ⓘ	0.003	0.008	0.000	122	25.0	22.3
Propamocarb	0.01	0.170	0.003	146	25.0	17.8
Propyzamide	0.01	0.083	0.001	158	25.0	15.0
Pyraclostrobin	0.01	0.076	0.001	154	25.0	15.2
Teflubenzuron	0.01	0.110	0.002	131	25.0	18.4
Trifloxystrobin	0.01	0.230	0.003	162	25.0	13.4
Triflumuron	0.01	0.469	0.009	137	25.0	17.3
Voluntary Pesticides						
Penthiopyrad	0.01	0.223	0.004	87	25.0	12.4
Spinetoram	0.01	0.056	0.002	86	25.0	21.6
Tritosulfuron	0.01	0.066	0.002	45	25.0	19.7

ⓘ Only for informative purposes

4.3 Assessment of laboratory performance

4.3.1 z scores

z scores were calculated using the FFP-RSD of 25 % for all the pesticides evaluated.

In Appendix 3 the individual z scores are presented for each laboratory, together with the concentrations reported for each pesticide. The z scores of laboratories from non-EU countries have been included in Appendix 3 but have not been considered in the following table.

Table 4.7 Classification of z scores for the pesticides reported (only EU/EFTA participants)

Pesticides	Acceptable (%)	Questionable (%)	Unacceptable (%)
Acetamiprid	94.3	1.9	3.8
Chlorantraniliprole	94.4	0.7	4.9
Chlorpropham	95.7	0.6	3.7
Chlorpyrifos	96.4	1.8	1.8
Clothianidin	96.7	0.0	3.3
Diazinon	96.4	3.0	0.6
Difenoconazole	92.3	3.6	4.1
Dimethoate	97.0	0.0	3.0
Fenamidone	95.0	1.9	3.1
Fluxapyroxad	92.2	1.7	6.1
Metaflumizone	87.2	5.6	7.2
Omethoateⓘ	92.6	3.3	4.1
Propamocarb	93.3	2.0	4.7
Propyzamide	98.1	0.6	1.3
Pyraclostrobin	92.4	4.4	3.2
Teflubenzuron	92.7	0.7	6.6
Trifloxystrobin	97.6	0.6	1.8
Triflumuron	93.0	2.1	4.9
Voluntary Pesticides			
Penthiopyrad	89.6	0.0	10.4
Spinetoram	85.1	4.3	10.6
Tritosulfuron	72.9	1.7	25.4

ⓘ Only for informative purposes

z scores for false negative results have been calculated using the MRRL value given in the Target Pesticide List (Annex A) or the RL value from the laboratory (whichever was lower).

In Appendix 4, graphical representations of the z scores of EU/EFTA laboratories are presented. No z scores have been calculated for false positive results; z scores for false negative results have been included on the chart and are indicated by an asterisk. The charts have been constructed using different colour bars according to the determination technique used for each pesticide.

4.3.2 Combined z scores

As previously mentioned in Section 3.5., the AZ^2 formula has only been applied to those participants categorised into Category A and considering only compulsory pesticides.

The table in Appendix 5 shows the values of individual z scores for each compulsory pesticide and the combined 'Average of the Squared z scores' (AZ^2) for all EU/EFTA laboratories in Category A (including non-EU countries), which were those laboratories that were able to analyse at least 90 % of the compulsory pesticides in the target pesticides list (15), to detect and quantify at least 90 % of the pesticides present in the Test Item (184), and that did not report any false positive result. A graphical representation of those results for the EU/EFTA laboratories can be found in Appendix 6.

One hundred and twelve of the 172 EU and EFTA laboratories that submitted results were classified into Category A (65 %).

From the AZ^2, 97.3 % were classed as 'good', 3.6 % as 'satisfactory' and 0 % as 'unsatisfactory' (Only considering EU and EFTA laboratories).

Of the 60 EU and EFTA laboratories in Category B, three had reported a false positive result. One of them would have been classified into Category A if not for that false positive result.

Table 4.8 shows all the laboratories in Category A, the number of pesticides reported, the percentage of pesticides analysed from the compulsory target list, the AZ^2 values and their subclassifications. Laboratories that reported false negative results in Category A are marked with the symbol Θ.

Table 4.9 shows all the laboratories in Category B, the number and percentage of results reported, the percentage of pesticides analysed from the compulsory target list and the number of acceptable z scores. Laboratories reporting a false negative are marked with the symbol Θ and laboratories reporting a false positive are marked with a '+'.

The AZ^2 graphical representation for EU/EFTA laboratories classified into Category A can be seen in Appendix 6. The EU National Reference Laboratories (NRLs) for Fruits and Vegetables have been plotted using a different colour.

Laboratory performance over the last three EUPTs using the AZ^2 formula has been summarized as follows:

- For EUPT-FV-20, out of 167 laboratories (EU and EFTA), 111 were in Category A with the following classes: 1 'unsatisfactory', 6 'satisfactory' and 104 'good'.
- For EUPT-FV-19, out of 153 laboratories (EU and EFTA), 101 were in Category A with the following classes: 3 'unsatisfactory', 5 'satisfactory' and 93 'good'.
- For EUPT-FV-18, out of 171 laboratories (EU and EFTA), 98 were in Category A with the following classes: 3 'unsatisfactory', 9 'satisfactory' and 86 'good'.

Table 4.8 Performance and Classification of laboratories in Category A using the AZ^2 formula

Lab Code	No. of pesticides detected (max.17)	% of pesticides analysed from target list	AZ^2	Classification
524	15	93	1.4	Good
528	17	100	1.7	Good
530	17	100	0.1	Good
532Θ	16	100	1.2	Good
534	17	100	0.5	Good
540	17	100	0.4	Good
544	17	99	0.4	Good
546	17	100	0.1	Good
548	17	100	0.4	Good
556	17	100	0.1	Good
558	17	100	0.4	Good
560	17	100	0.3	Good
562	17	99	0.4	Good
564	17	98	0.6	Good
566	17	95	0.5	Good
568	17	96	0.5	Good
580	17	97	0.1	Good
582	17	99	0.5	Good
584	17	100	0.7	Good
586	17	95	0.3	Good
588	16	92	1.4	Good
590	17	100	0.1	Good
592	17	94	0.3	Good
594	17	98	1.7	Good
596	17	99	0.4	Good
598Θ	16	100	1.1	Good
602	17	98	1.3	Good
604	17	100	0.1	Good
606	17	94	1.2	Good
610	17	99	0.2	Good
616	17	98	0.4	Good
618	17	100	0.2	Good
622	17	93	0.2	Good
624	17	100	0.3	Good
626	17	97	1.8	Good
632	17	98	1.7	Good
634	17	97	0.3	Good
636	17	98	0.2	Good
640	17	98	0.6	Good
642	17	100	0.3	Good
646	17	100	0.3	Good
648	17	96	0.4	Good
654	17	99	0.1	Good
666	16	90	0.4	Good
668Θ	15	91	2.1	Satisfactory
670	17	95	0.1	Good
674	17	99	0.4	Good

Lab Code	No. of pesticides detected (max.17)	% of pesticides analysed from target list	AZ[2]	Classification
676	17	98	0.3	Good
678	16	94	0.5	Good
680Θ	16	96	0.9	Good
682	16	95	0.2	Good
684	17	96	1.1	Good
686	17	100	0.1	Good
690	17	97	0.2	Good
692	17	100	0.3	Good
698	17	100	0.6	Good
700	17	100	0.3	Good
702	17	98	0.3	Good
704	17	94	0.6	Good
706Θ	16	100	1.1	Good
708	17	100	0.2	Good
710	17	100	0.2	Good
712	17	94	0.6	Good
714Θ	16	92	2.5	Satisfactory
718	17	96	0.5	Good
720	17	100	0.8	Good
726	17	100	0.2	Good
728	17	100	0.5	Good
730	17	100	0.3	Good
734	17	100	0.1	Good
736Θ	15	90	1.1	Good
740	15	95	2.1	Satisfactory
744	17	100	0.6	Good
750	17	94	0.4	Good
752	17	100	1.7	Good
754	16	93	0.6	Good
756	17	96	0.6	Good
760	17	99	0.1	Good
764	17	97	0.1	Good
768	17	100	0.4	Good
770	17	100	0.2	Good
778	17	100	1.0	Good
782	16	92	2.2	Satisfactory
784	17	100	0.1	Good
786	17	94	0.4	Good
788	17	100	0.6	Good
792	17	99	0.5	Good
794	17	96	0.2	Good
796	17	100	1.6	Good
802	17	91	1.3	Good
804	17	97	0.7	Good
810	17	98	2.4	Satisfactory
818	17	100	0.4	Good
820	17	100	0.8	Good
824	17	100	0.3	Good

Lab Code	No. of pesticides detected (max.17)	% of pesticides analysed from target list	AZ[2]	Classification
826	17	100	0.3	Good
828	17	100	0.8	Good
836	17	100	0.2	Good
838	17	100	1.6	Good
840	17	100	1.5	Good
844	16	99	0.6	Good
848	17	100	0.4	Good
858	17	100	0.1	Good
862	16	92	0.5	Good
872	17	99	0.1	Good
876	17	100	0.3	Good
880	17	100	0.2	Good
892Θ	16	100	1.2	Good
902	17	100	0.1	Good
904	17	98	0.3	Good
908	16	100	0.7	Good
910	17	98	0.3	Good
914Θ	16	98	1.3	Good
916	17	95	0.3	Good
918	17	100	0.5	Good
920	17	100	0.2	Good
922	17	100	0.1	Good
924	17	100	0.1	Good

Θ Laboratories reporting a false negative result.

Table 4.9 Performance of laboratories in Category B

Lab Code	% No. of pesticides detected / No. of pesticides evaluated (17)	No. of pesticides detected	% of pesticides analysed from target list	No. of total z scores	No. of acceptable z scores (z score ≤ 2)
522	18	3	29	3	3
536	65	11	44	11	11
538	94	16	71	16	14
550Θ	82	14	82	16	14
552	82	14	65	14	14
554	53	9	68	9	8
570	94	16	80	16	15
572	82	14	85	14	14
574	59	10	63	10	10
576Θ	65	11	73	16	7
600Θ	47	8	76	11	7
608	53	9	45	9	5
612	18	3	33	3	3
614	94	16	78	16	15
620	94	16	87	16	16
628Θ	82	14	90	15	6
638	65	11	52	11	11

Lab Code	% No. of pesticides detected / No. of pesticides evaluated (17)	No. of pesticides detected	% of pesticides analysed from target list	No. of total z scores	No. of acceptable z scores (z score ≤ 2)
644	100	17	81	17	17
650	82	14	76	14	14
656	76	13	66	13	13
658	53	9	60	9	9
660	82	14	80	14	14
662	76	13	71	13	13
664	41	7	57	7	7
672	82	14	77	14	14
688	41	7	45	7	7
694Θ	82	14	85	15	14
696Θ	76	13	88	14	12
716+	18	3	13	3	3
722+	94	16	97	16	16
724Θ	47	8	75	9	7
732	53	9	40	9	9
738Θ	47	8	66	12	3
742	100	17	88	17	17
746	76	13	76	13	13
748	71	12	67	12	9
758+	100	17	98	17	16
762	29	5	38	5	5
766	71	12	66	12	10
772Θ	82	14	88	15	14
774	59	10	45	10	10
776	47	8	59	8	8
780	76	13	62	13	12
798	76	13	62	13	13
800	76	13	75	13	13
814Θ	76	13	96	16	11
816	59	10	65	10	10
822	29	5	36	5	5
830	88	15	87	15	14
834	53	9	62	9	8
850	76	13	81	13	10
852	82	14	89	14	14
854	47	8	43	8	7
856	6	1	6	1	0
866	82	14	86	14	12
868Θ+	82	14	90	15	14
870	88	15	76	15	15
874	41	7	53	7	7
878Θ	76	13	72	14	11
882+	82	14	74	14	14
884+	82	14	81	14	11
886Θ	35	6	46	8	5
888	47	8	95	8	8
890Θ	41	7	100	17	6
896Θ	18	3	100	17	3

Lab Code	% No. of pesticides detected / No. of pesticides evaluated (17)	No. of pesticides detected	% of pesticides analysed from target list	No. of total z scores	No. of acceptable z scores (z score ≤ 2)
912Θ	53	9	64	10	9
926	88	15	86	15	15
928	18	3	16	3	3
930Θ	71	12	73	13	12
932	82	14	77	14	14
1116Θ	41	7	100	17	7

Θ Laboratories reporting a false negative result.
+ Laboratories reporting a false positive result.

5. CONCLUSIONS

One hundred and ninety laboratories agreed to participate in EUPT-FV-21. One of them cancelled its participation. From the remaining 189 laboratories that submitted results, 17 did not belong to EU nor EFTA countries, so their results were not considered for the estimation of the assigned value.

From the total 20 pesticides used to treat the test item, 17 mandatory and three voluntary pesticides were evaluated in EUPT-FV-21, based on the analysis of red cabbage homogenate. Additionally, omethoate was present in the test item due to the treatment of the red cabbage plants with dimethoate. However, as the assigned value for omethoate was 0.008 mg/kg, which is below three times omethoate´s MRRL (0.003 mg/kg), it was excluded from the data treatment.

Of a total number of 2924 possible determinations from EU/EFTA laboratories (172 laboratories by 17 evaluated pesticides), 86.9 % were reported, 11.2 % were not analysed and 1.9 % were not detected (false negative results).

The total number of z scores of laboratories from EU/EFTA countries was 2597, with 94.6 % of them acceptable, 1.8 % questionable and 3.6 % unacceptable.

65 % of the EU and EFTA laboratories that submitted results were classified into Category A. Of them, 97.3 % were classed as 'good', 3.6 % as 'satisfactory' and 0 % as 'unsatisfactory'.

The robust standard deviation (CV*) was in all cases below 25 %, with an average value of 15.8 % for the 17 pesticides evaluated.

Participation in this year's European Proficiency Test 21 involved at least one laboratory from each Member State. Additionally, laboratories from Iceland, Norway and Switzerland participated as EFTA countries. As laid down in paragraph 2 (h) of Article 94 of Regulation (EU) 2017/625, one of the EURL's duties is to collaborate with non-EU laboratories that are responsible for analysing food and feed samples and to help them improve the quality of their analyses. Non-

European laboratories from China, Colombia, Costa Rica, Kenya, Peru, Saudi Arabia, Serbia, Singapore, Thailand, Turkey and Uruguay participated in EUPT-FV-21.

6. REFERENCES

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4. P. Medina Pastor, A. Valverde, T. Pihlström, S. Masselter, M. Gamón, M. Mezcua, C. Rodríguez Torreblanca, A. R. Fernández-Alba. Comparative Study of the Main Top-down Approaches for the Estimation of Measurement Uncertainty in Multiresidue Analysis of Pesticides in Fruits and Vegetables. J. Agric. Food Chem., 2011, 59 (14), 7609-7619.

5. P. Medina-Pastor, M. Mezcua, C. Rodríguez-Torreblanca, A. R. Fernández-Alba. Laboratory assessment by combined z-score values in proficiency tests: experience gained through the European Union proficiency tests for pesticide residues in fruits and vegetables. Anal. Bioanal. Chem., 2010, 397, 3061–3070.

7. ACKNOWLEDGEMENTS

The Organiser is most grateful to the European Commission for funding this European Proficiency Test FV-21.

The Organiser wishes to thank the members of the Quality Control Group and the Scientific Committee for their invaluable expert advice.

The Organiser wishes to give a special thank-you to the University of Almeria for the use of their facilities.

Acetamiprid (mg/kg)		Chlorantraniprole (mg/kg)		Chlorpyrifos (mg/kg)		Chlorpropham (mg/kg)	
Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2
0.190	0.180	0.140	0.140	0.053	0.059	0.076	0.080
0.180	0.190	0.140	0.140	0.053	0.061	0.077	0.087
0.190	0.180	0.140	0.130	0.050	0.055	0.090	0.088
0.190	0.190	0.130	0.140	0.056	0.056	0.095	0.086
0.190	0.180	0.130	0.140	0.055	0.051	0.083	0.081
0.180	0.180	0.130	0.130	0.053	0.055	0.092	0.094
0.180	0.190	0.140	0.140	0.059	0.059	0.089	0.090
0.180	0.190	0.140	0.140	0.056	0.059	0.091	0.090
0.180	0.190	0.140	0.140	0.058	0.057	0.082	0.081
0.180	0.190	0.130	0.140	0.058	0.058	0.085	0.092

Clothianidin (mg/kg)		Diazinon (mg/kg)		Difenoconazole (mg/kg)		Dimethoate (mg/kg)	
Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2
0.061	0.060	0.079	0.087	0.170	0.180	0.140	0.140
0.058	0.061	0.088	0.094	0.180	0.180	0.140	0.140
0.056	0.058	0.090	0.092	0.190	0.200	0.140	0.140
0.057	0.057	0.095	0.093	0.180	0.200	0.140	0.150
0.057	0.061	0.087	0.086	0.180	0.180	0.150	0.150
0.048	0.059	0.094	0.097	0.160	0.170	0.140	0.130
0.060	0.062	0.093	0.093	0.190	0.190	0.140	0.140
0.057	0.058	0.100	0.100	0.180	0.170	0.140	0.140
0.059	0.061	0.090	0.087	0.200	0.190	0.140	0.140
0.056	0.058	0.088	0.10	0.200	0.190	0.140	0.140

Fenamidone (mg/kg)		Fluxapyrosad (mg/kg)		Metaflumizone (mg/kg)		Omethoateⓘ (mg/kg)	
Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2
0.590	0.600	0.580	0.580	0.191	0.199	0.010	0.009
0.590	0.630	0.580	0.600	0.200	0.212	0.009	0.009
0.600	0.560	0.560	0.570	0.210	0.211	0.009	0.009
0.590	0.630	0.560	0.590	0.213	0.221	0.008	0.009
0.590	0.610	0.550	0.550	0.196	0.189	0.009	0.009
0.580	0.580	0.570	0.560	0.210	0.200	0.009	0.009
0.610	0.620	0.560	0.570	0.222	0.215	0.009	0.010
0.590	0.610	0.570	0.590	0.217	0.214	0.008	0.009
0.600	0.630	0.570	0.570	0.226	0.225	0.009	0.009
0.620	0.630	0.570	0.590	0.208	0.216	0.009	0.009

ⓘFor informative purposes only

The sample numbers used for this test were: 26, 28, 35, 58, 91, 167, 184, 199, 210 and 249.

APPENDIX 1. Homogeneity data.

Pyraclostrobin (mg/kg)		Propamocarb (mg/kg)		Propyzamide (mg/kg)		Teflubenzuron (mg/kg)	
Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2
0.078	0.073	0.190	0.180	0.087	0.098	0.400	0.450
0.073	0.076	0.190	0.200	0.098	0.100	0.420	0.490
0.073	0.073	0.190	0.180	0.100	0.098	0.450	0.480
0.074	0.075	0.190	0.190	0.100	0.099	0.460	0.450
0.072	0.075	0.190	0.190	0.094	0.096	0.430	0.410
0.072	0.075	0.180	0.190	0.100	0.110	0.390	0.440
0.077	0.079	0.190	0.190	0.100	0.100	0.430	0.430
0.072	0.075	0.180	0.190	0.110	0.110	0.400	0.460
0.076	0.080	0.180	0.190	0.099	0.093	0.440	0.450
0.074	0.077	0.200	0.200	0.100	0.110	0.390	0.380

Trifloxystrobin (mg/kg)		Triflumuron (mg/kg)	
Replicate 1	Replicate 2	Replicate 1	Replicate 2
0.250	0.260	0.470	0.470
0.260	0.280	0.470	0.490
0.260	0.250	0.470	0.470
0.260	0.270	0.470	0.500
0.240	0.260	0.460	0.460
0.240	0.250	0.470	0.470
0.260	0.260	0.490	0.490
0.240	0.270	0.470	0.490
0.250	0.270	0.470	0.500
0.250	0.260	0.490	0.490

Voluntary Pesticides

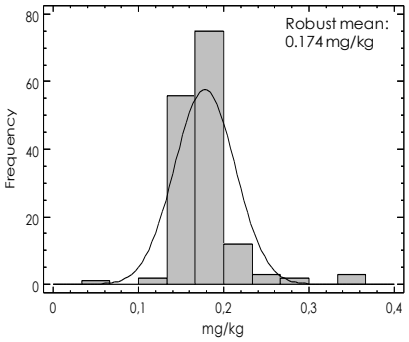
Penthiopyrad (mg/kg)		Spinetoram (mg/kg)		Tritosulfuron (mg/kg)	
Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2
0.260	0.250	0.125	0.117	0.080	0.075
0.270	0.270	0.116	0.122	0.074	0.079
0.270	0.250	0.116	0.115	0.077	0.077
0.270	0.280	0.114	0.116	0.075	0.073
0.260	0.250	0.114	0.119	0.076	0.079
0.250	0.260	0.114	0.118	0.076	0.079
0.260	0.270	0.118	0.123	0.080	0.080
0.270	0.260	0.114	0.115	0.077	0.077
0.260	0.270	0.118	0.125	0.078	0.080
0.270	0.260	0.125	0.124	0.073	0.076

The sample numbers used for this test were: 26, 28, 35, 58, 91, 167, 184, 199, 210 and 249.

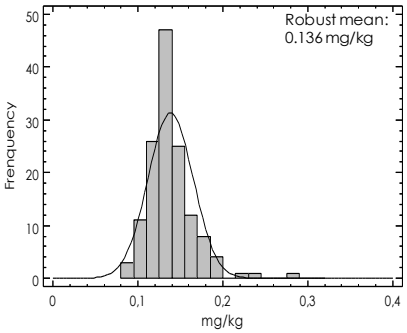
APPENDIX 2. Histograms of residue data for each pesticide from EU/EFTA laboratories.

Results presented as histograms.

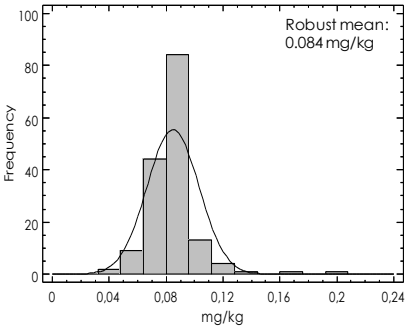
Acetamiprid



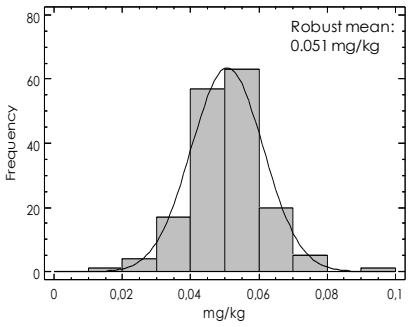
Chlorantraniliprole



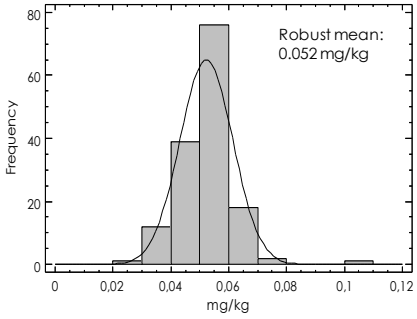
Chlorpropham



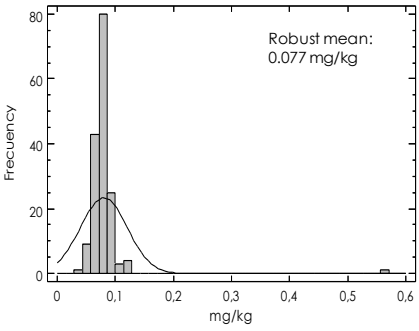
Chlorpyrifos



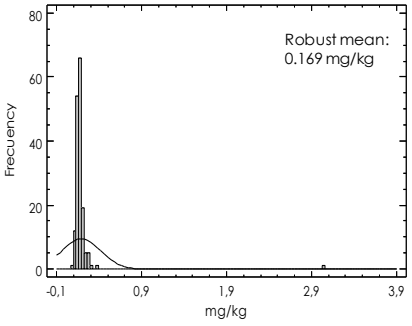
Clothianidin



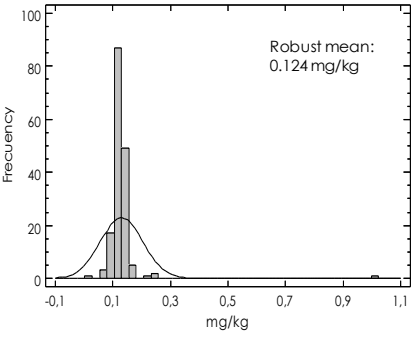
Diazinon



Difenoconazole

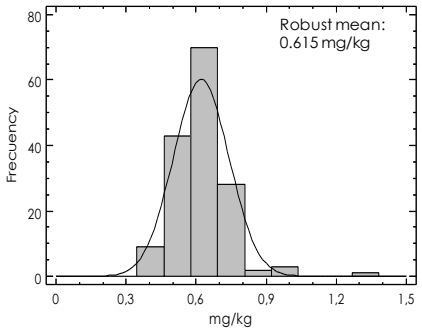


Dimethoate

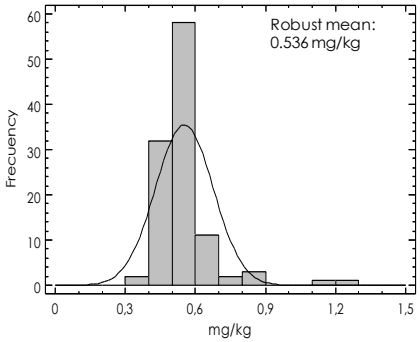


APPENDIX 2. Histograms of residue data for each pesticide from EU/EFTA laboratories.

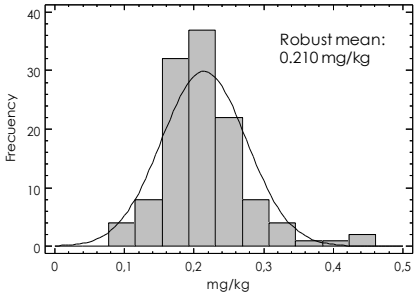
Fenamidone



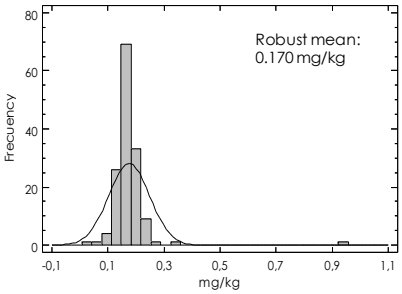
Fluxapyrosad



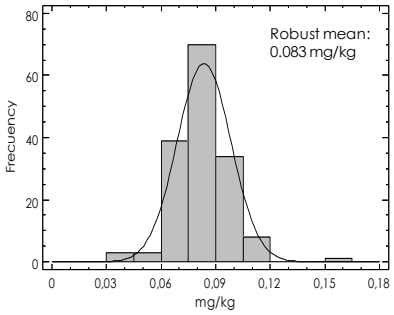
Metaflumizone



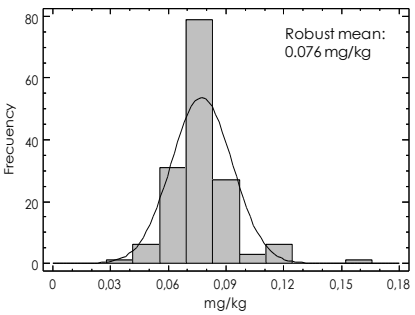
Propamocarb



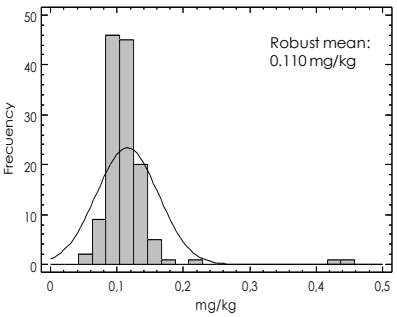
Propyzamide



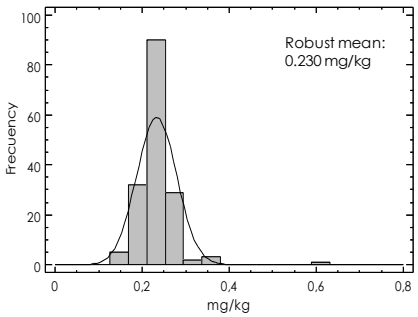
Pyraclostrobin



Teflubenzuron

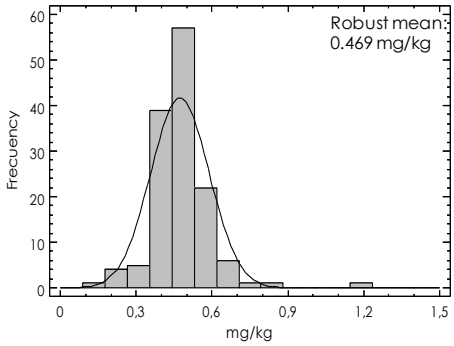


Trifloxystrobin



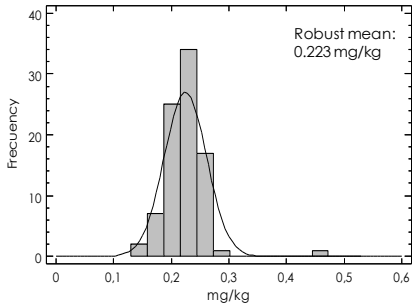
APPENDIX 2. Histograms of residue data for each pesticide from EU/EFTA laboratories.

Triflumuron

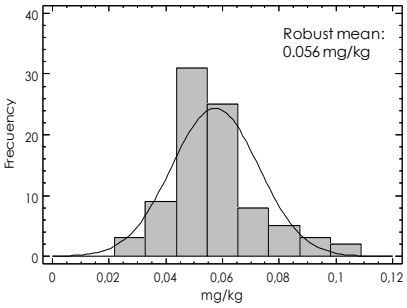


Voluntary pesticides

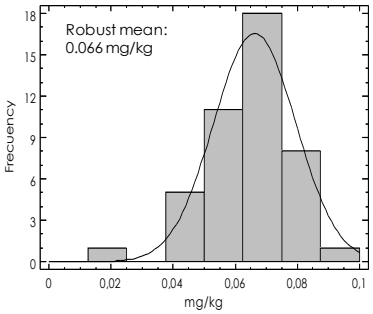
Penthiopyrad



Spinetoram

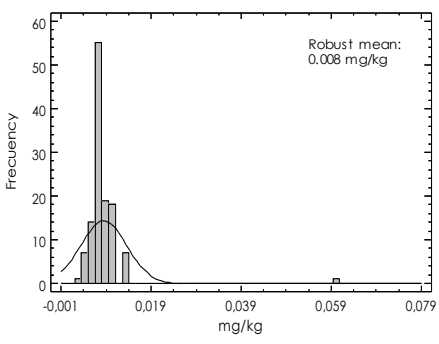


Tritosulfuron



Only for informatives purposes

Omethoate



APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Results reported by the laboratories for the mandatory pesticides acetamiprid, chlorantraniliprole, chlorpropham, chlorpyrifos, clothianidin, diazinon, difenoconazole, dimethoate, fenamidone, fluxapyroxad, metaflumizone (sum of e- and z- isomers), propamocarb, propyzamide, pyraclostrobin, teflubenzuron, trifloxystrobin, triflumuron (mg/kg) and their calculated z score value using FFP-RSD 25 %

Lab Code	Acetamiprid	z score (FFP-RSD 25 %)	Chlorantraniprole	z score (FFP-RSD 25 %)	Chlorpropham	z score (FFP-RSD 25 %)	Chlorpyrifos	z score (FFP-RSD 25 %)	Chlothianidin	z score (FFP-RSD 25 %)	Diazinon	z score (FFP-RSD 25 %)	Difenoconazole	z score (FFP-RSD 25 %)	Dimethoate	z score (FFP-RSD 25 %)	Fenamidone	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.01**		**0.010**		**0.003**		**0.010**	
Robust mean (mg/kg)	**0.17**		**0.14**		**0.08**		**0.05**		**0.05**		**0.08**		**0.17**		**0.12**		**0.62**	
Lab522	NA	NA	NA	NA	NA	NA	0.055	0.3	NA	NA	0.085	0.4	0.170	0.0	NA	NA	NA	NA
Lab524	0.180	0.1	0.130	-0.2	0.078	-0.3	0.047	-0.3	0.052	0.0	0.067	-0.5	0.140	-0.7	0.120	-0.1	1.300	4.5
Lab528	0.182	0.2	0.136	0.0	0.089	0.2	0.059	0.6	0.060	0.6	0.093	0.9	0.191	0.5	0.140	0.5	0.613	0.0
Lab530	0.159	-0.3	0.124	-0.3	0.076	-0.4	0.052	0.1	0.052	0.0	0.079	0.1	0.162	-0.2	0.119	-0.2	0.680	0.4
Lab532	0.186	0.3	0.149	0.4	0.090	0.3	0.053	0.2	0.055	0.2	0.082	0.3	0.197	0.7	0.151	0.9	0.719	0.7
Lab534	0.176	0.0	0.152	0.5	0.096	0.6	0.066	1.2	0.058	0.5	0.096	1.0	0.180	0.3	0.114	-0.3	0.654	0.3
Lab536	0.188	0.3	NA	NA	NA	NA	NA	NA	0.061	0.7	NA	NA	0.167	0.0	0.126	0.1	0.683	0.4
Lab538	0.300	2.9	0.240	3.1	0.080	-0.2	0.061	0.8	0.059	0.5	0.075	-0.1	0.160	-0.2	0.170	1.5	0.700	0.6
Lab540	0.196	0.5	0.134	-0.1	0.093	0.4	0.056	0.4	0.057	0.4	0.111	1.8	0.192	0.5	0.125	0.0	0.703	0.6
Lab544	0.170	-0.1	0.142	0.2	0.081	-0.2	0.041	-0.8	0.058	0.5	0.071	-0.3	0.139	-0.7	0.123	0.0	0.526	-0.6
Lab546	0.170	-0.1	0.133	-0.1	0.088	0.2	0.054	0.2	0.052	0.0	0.086	0.5	0.184	0.4	0.141	0.6	0.633	0.1
Lab548	0.156	-0.4	0.110	-0.8	0.084	0.0	0.043	-0.6	0.042	-0.8	0.066	-0.5	0.143	-0.6	0.117	-0.2	0.505	-0.7
Lab550	0.140	-0.8	NA	NA	0.089	0.2	0.046	-0.4	0.056	0.3	0.079	0.1	0.200	0.7	0.120	-0.1	0.540	-0.5
Lab552	0.177	0.1	0.184	1.4	0.087	0.1	0.043	-0.6	0.042	-0.8	0.071	-0.3	0.186	0.4	0.127	0.1	0.714	0.6
Lab554	NA	NA	NA	NA	0.087	0.1	0.046	-0.4	NA	NA	0.082	0.3	0.142	-0.6	0.127	0.1	0.467	-1.0
Lab556	0.186	0.3	0.127	-0.3	0.078	-0.3	0.053	0.2	0.050	-0.2	0.075	-0.1	0.174	0.1	0.139	0.5	0.693	0.5
Lab558	0.150	-0.6	0.123	-0.4	0.091	0.3	0.047	-0.3	0.046	-0.5	0.064	-0.7	0.140	-0.7	0.115	-0.3	0.513	-0.7
Lab560	0.172	0.0	0.129	-0.2	0.097	0.6	0.057	0.5	0.068	1.2	0.083	0.3	0.182	0.3	0.131	0.2	0.690	0.5
Lab562	0.177	0.1	0.124	-0.3	0.097	0.6	0.047	-0.3	0.034	-1.4	0.083	0.3	0.165	-0.1	0.124	0.0	0.701	0.6
Lab564	0.184	0.2	0.148	0.4	0.081	-0.1	0.055	0.3	0.045	-0.5	0.075	-0.1	0.198	0.7	0.123	0.0	0.904	1.9
Lab566	0.173	0.0	0.131	-0.1	0.066	-0.8	0.043	-0.6	0.053	0.1	0.073	-0.2	0.173	0.1	0.123	0.0	0.611	0.0
Lab568	0.195	0.5	0.160	0.7	0.069	-0.7	0.044	-0.5	0.062	0.8	0.060	-0.8	0.206	0.9	0.109	-0.5	0.518	-0.6
Lab570	0.172	0.0	0.159	0.7	0.103	0.9	0.073	1.7	0.049	-0.2	0.091	0.8	0.187	0.4	0.112	-0.4	0.787	1.1
Lab572	0.180	0.1	0.150	0.4	0.087	0.1	0.056	0.4	0.060	0.6	0.080	0.2	0.200	0.7	0.140	0.5	0.620	0.0
Lab574	NA	NA	0.125	-0.3	0.089	0.2	0.052	0.1	NA	NA	0.082	0.3	0.172	0.1	0.083	-1.3	0.617	0.0
Lab576	0.348	4.0	ND	-3.7	0.205	5.0	0.053	0.2	0.068	1.2	0.109	1.7	ND	-3.8	0.230	3.4	0.410	-1.3
Lab580	0.166	-0.2	0.132	-0.1	0.090	0.3	0.055	0.3	0.049	-0.2	0.081	0.2	0.174	0.1	0.125	0.0	0.668	0.3

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Acetamiprid	z score (FFP-RSD 25 %)	Chlorantraniprole	z score (FFP-RSD 25 %)	Chlorpropham	z score (FFP-RSD 25 %)	Chlorpyrifos	z score (FFP-RSD 25 %)	Chlothianidin	z score (FFP-RSD 25 %)	Diazinon	z score (FFP-RSD 25 %)	Difenoconazole	z score (FFP-RSD 25 %)	Dimethoate	z score (FFP-RSD 25 %)	Fenamidone	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.01**		**0.010**		**0.003**		**0.010**	
Robust mean (mg/kg)	**0.17**		**0.14**		**0.08**		**0.05**		**0.05**		**0.08**		**0.17**		**0.12**		**0.62**	
Lab582	0.161	-0.3	0.129	-0.2	0.084	0.0	0.053	0.2	0.052	0.0	0.121	2.3	0.167	0.0	0.115	-0.3	0.668	0.3
Lab584	0.190	0.4	0.150	0.4	0.067	-0.8	0.037	-1.1	0.060	0.6	0.056	-1.1	0.120	-1.2	0.140	0.5	0.500	-0.7
Lab586	0.159	-0.3	0.127	-0.3	0.092	0.4	0.051	0.0	0.054	0.2	0.094	0.9	0.174	0.1	0.110	-0.4	0.596	-0.1
Lab588	0.210	0.8	0.190	1.6	0.068	-0.8	0.048	-0.2	0.057	0.4	0.051	-1.3	0.160	-0.2	0.140	0.5	0.490	-0.8
Lab590	0.193	0.4	0.138	0.1	0.092	0.4	0.063	0.9	0.051	-0.1	0.079	0.2	0.174	0.1	0.128	0.1	0.602	-0.1
Lab592	0.194	0.5	0.136	0.0	0.087	0.1	0.062	0.9	0.057	0.4	0.080	0.2	0.158	-0.3	0.137	0.4	0.690	0.5
Lab594	0.140	-0.8	0.122	-0.4	0.063	-1.0	0.035	-1.2	0.048	-0.3	0.050	-1.4	0.101	-1.6	0.090	-1.1	0.537	-0.5
Lab596	0.167	-0.2	0.126	-0.3	0.066	-0.9	0.046	-0.4	0.049	-0.2	0.060	-0.9	0.146	-0.5	0.124	0.0	0.500	-0.7
Lab598	0.151	-0.5	0.113	-0.7	0.070	-0.7	0.057	0.5	0.042	-0.8	0.070	-0.3	0.147	-0.5	0.101	-0.7	0.585	-0.2
Lab600	NA	NA	ND	-3.7	0.074	-0.5	0.049	-0.1	NA	NA	0.074	-0.1	0.133	-0.9	0.023	-3.3	0.422	-1.3
Lab602	0.160	-0.3	0.095	-1.2	0.059	-1.2	0.031	-1.6	0.063	0.8	0.050	-1.4	0.130	-0.9	0.160	1.2	0.380	-1.5
Lab604	0.178	0.1	0.156	0.6	0.089	0.2	0.052	0.1	0.050	-0.2	0.067	-0.5	0.185	0.4	0.128	0.1	0.568	-0.3
Lab606	0.190	0.4	0.170	1.0	0.130	2.2	0.066	1.2	0.065	1.0	0.084	0.4	0.180	0.3	0.150	0.8	0.690	0.5
Lab608	0.130	-1.0	0.190	1.6	NA	NA	0.092	3.2	0.038	-1.1	0.120	2.3	0.300	3.1	0.100	-0.8	NA	NA
Lab610	0.159	-0.3	0.145	0.3	0.081	-0.1	0.047	-0.3	0.050	-0.1	0.074	-0.1	0.160	-0.2	0.115	-0.3	0.633	0.1
Lab612	NA	NA	NA	NA	0.084	0.0	0.062	0.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab614	0.210	0.8	0.138	0.1	0.083	0.0	0.040	-0.9	0.061	0.7	0.072	-0.2	0.287	2.8	0.156	1.0	0.752	0.9
Lab616	0.184	0.2	0.150	0.4	0.057	-1.3	0.065	1.1	0.050	-0.2	0.096	1.0	0.205	0.9	0.139	0.5	0.628	0.1
Lab618	0.165	-0.2	0.124	-0.3	0.075	-0.4	0.046	-0.4	0.047	-0.4	0.074	-0.1	0.148	-0.5	0.117	-0.2	0.551	-0.4
Lab620	0.136	-0.9	0.101	-1.0	0.073	-0.5	0.034	-1.3	0.043	-0.7	0.051	-1.3	0.116	-1.3	0.105	-0.6	0.484	-0.9
Lab622	0.159	-0.3	0.115	-0.6	0.088	0.2	0.053	0.2	0.064	0.9	0.080	0.2	0.158	-0.3	0.127	0.1	0.568	-0.3
Lab624	0.188	0.3	0.133	-0.1	0.100	0.8	0.062	0.9	0.056	0.3	0.085	0.4	0.179	0.2	0.130	0.2	0.634	0.1
Lab626	0.278	2.4	0.168	0.9	0.083	0.0	0.058	0.6	0.052	0.0	0.080	0.2	0.154	-0.4	0.176	1.7	0.634	0.1
Lab628	0.334	3.7	NA	NA	0.084	0.0	0.054	0.2	0.102	3.8	0.082	0.3	0.280	2.6	0.254	4.2	0.735	0.8
Lab632	0.170	-0.1	0.122	-0.4	0.117	1.6	0.060	0.7	0.052	0.0	0.120	2.3	0.186	0.4	0.123	0.0	0.717	0.7
Lab634	0.203	0.7	0.140	0.1	0.082	-0.1	0.052	0.1	0.058	0.4	0.082	0.3	0.188	0.5	0.145	0.7	0.722	0.7
Lab636	0.147	-0.6	0.120	-0.5	0.094	0.5	0.049	-0.1	0.054	0.1	0.077	0.0	0.167	0.0	0.127	0.1	0.522	-0.6
Lab638	0.171	-0.1	0.133	-0.1	0.090	0.3	0.059	0.6	0.052	0.0	0.083	0.3	0.170	0.0	0.128	0.1	0.630	0.1
Lab640	0.170	-0.1	0.126	-0.3	0.067	-0.8	0.047	-0.3	0.053	0.1	0.061	-0.8	0.134	-0.8	0.131	0.2	0.496	-0.8
Lab642	0.151	-0.5	0.116	-0.6	0.068	-0.8	0.041	-0.8	0.048	-0.3	0.065	-0.6	0.133	-0.9	0.105	-0.6	0.602	-0.1
Lab644	0.192	0.4	0.134	-0.1	0.092	0.4	0.049	-0.1	0.045	-0.5	0.067	-0.5	0.152	-0.4	0.131	0.2	0.545	-0.5

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Acetamiprid	z score (FFP-RSD 25 %)	Chlorantraniprole	z score (FFP-RSD 25 %)	Chlorpropham	z score (FFP-RSD 25 %)	Chlorpyrifos	z score (FFP-RSD 25 %)	Chlothianidin	z score (FFP-RSD 25 %)	Diazinon	z score (FFP-RSD 25 %)	Difenoconazole	z score (FFP-RSD 25 %)	Dimethoate	z score (FFP-RSD 25 %)	Fenamidone	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.01**		**0.010**		**0.003**		**0.010**	
Robust mean (mg/kg)	**0.17**		**0.14**		**0.08**		**0.05**		**0.05**		**0.08**		**0.17**		**0.12**		**0.62**	
Lab646	0.152	-0.5	0.114	-0.6	0.070	-0.7	0.046	-0.4	0.048	-0.3	0.066	-0.5	0.138	-0.7	0.112	-0.4	0.636	0.1
Lab648	0.175	0.0	0.173	1.1	0.100	0.8	0.053	0.1	0.048	-0.3	0.064	-0.7	0.131	-0.9	0.117	-0.2	0.551	-0.4
Lab650	0.160	-0.3	0.130	-0.2	NA	NA	0.060	0.7	0.050	-0.2	0.085	0.4	0.170	0.0	0.120	-0.1	0.660	0.3
Lab654	0.146	-0.6	0.140	0.1	0.094	0.5	0.052	0.1	0.050	-0.2	0.074	-0.1	0.170	0.0	0.120	-0.1	0.620	0.0
Lab656	0.145	-0.7	0.095	-1.2	0.083	0.0	0.050	-0.1	0.034	-1.4	NA	NA	0.120	-1.2	0.076	-1.5	0.370	-1.6
Lab658	0.165	-0.2	NA	NA	0.082	-0.1	0.048	-0.2	NA	NA	0.083	0.3	0.197	0.7	0.125	0.0	NA	NA
Lab660	0.172	0.0	0.144	0.2	0.092	0.4	0.057	0.5	0.056	0.3	0.098	1.1	0.178	0.2	0.129	0.2	0.587	-0.2
Lab662	0.167	-0.2	NA	NA	0.085	0.1	0.040	-0.9	0.051	-0.1	0.063	-0.7	0.175	0.1	0.126	0.1	0.586	-0.2
Lab664	NA	NA	NA	NA	0.085	0.1	0.048	-0.2	NA	NA	0.074	-0.1	0.182	0.3	0.080	-1.4	0.670	0.4
Lab666	0.160	-0.3	0.125	-0.3	0.083	0.0	0.074	1.8	0.055	0.2	0.088	0.6	0.210	1.0	0.113	-0.4	0.715	0.6
Lab668	0.170	-0.1	0.160	0.7	0.075	-0.4	0.062	0.9	0.051	-0.1	0.069	-0.4	0.180	0.3	0.150	0.8	0.730	0.7
Lab670	0.179	0.1	0.130	-0.2	0.079	-0.2	0.040	-0.9	0.053	0.1	0.077	0.0	0.161	-0.2	0.131	0.2	0.615	0.0
Lab672	0.154	-0.5	0.118	-0.5	0.096	0.6	0.047	-0.3	0.073	1.6	0.091	0.8	0.188	0.5	0.106	-0.6	0.717	0.7
Lab674	0.210	0.8	0.110	-0.8	0.075	-0.4	0.034	-1.3	0.054	0.1	0.067	-0.5	0.150	-0.4	0.150	0.8	0.610	0.0
Lab676	0.167	-0.2	0.111	-0.7	0.084	0.0	0.054	0.2	0.041	-0.9	0.076	0.0	0.188	0.5	0.123	0.0	0.653	0.2
Lab678	0.240	1.5	0.150	0.4	0.083	0.0	0.045	-0.5	0.061	0.7	0.068	-0.4	0.196	0.6	0.165	1.3	0.790	1.1
Lab680	0.157	-0.4	0.111	-0.7	ND	-3.5	0.054	0.2	0.042	-0.8	0.077	0.0	0.158	-0.3	0.118	-0.2	0.637	0.1
Lab682	0.182	0.2	0.125	-0.3	0.099	0.7	0.048	-0.2	0.054	0.1	0.084	0.4	0.157	-0.3	0.111	-0.4	0.579	-0.2
Lab684	0.207	0.8	0.156	0.6	0.070	-0.7	0.046	-0.4	0.049	-0.2	0.067	-0.5	0.178	0.2	0.131	0.2	0.976	2.3
Lab686	0.203	0.7	0.133	-0.1	0.091	0.3	0.053	0.2	0.060	0.6	0.091	0.8	0.179	0.2	0.130	0.2	0.594	-0.1
Lab688	NA	NA	NA	NA	0.100	0.8	0.073	1.7	NA	NA	0.096	1.0	0.222	1.3	0.103	-0.7	NA	NA
Lab690	0.172	0.0	0.126	-0.3	0.080	-0.2	0.047	-0.3	0.046	-0.5	0.077	0.0	0.174	0.1	0.104	-0.6	0.565	-0.3
Lab692	0.160	-0.3	0.125	-0.3	0.097	0.6	0.063	1.0	0.037	-1.2	0.084	0.4	0.167	0.0	0.124	0.0	0.671	0.4
Lab694	0.168	-0.1	0.130	-0.2	0.075	-0.4	0.050	-0.1	0.057	0.4	0.081	0.2	0.150	-0.4	0.142	0.6	0.654	0.3
Lab696	ND	-3.8	0.196	1.8	0.085	0.1	0.054	0.2	0.069	1.3	0.091	0.8	0.201	0.8	0.108	-0.5	0.698	0.5
Lab698	0.170	-0.1	0.160	0.7	0.086	0.1	0.055	0.3	0.040	-0.9	0.086	0.5	0.185	0.4	0.125	0.0	0.550	-0.4
Lab700	0.163	-0.3	0.149	0.4	0.079	-0.2	0.066	1.2	0.048	-0.3	0.080	0.2	0.169	0.0	0.114	-0.3	0.566	-0.3
Lab702	0.194	0.5	0.150	0.4	0.089	0.2	0.057	0.5	0.058	0.5	0.068	-0.4	0.198	0.7	0.128	0.1	0.738	0.8
Lab704	0.138	-0.8	0.174	1.1	0.092	0.4	0.054	0.2	0.034	-1.4	0.080	0.2	0.178	0.2	0.106	-0.6	0.750	0.9
Lab706	0.189	0.3	0.120	-0.5	0.077	-0.3	0.051	0.0	0.046	-0.5	0.076	0.0	0.161	-0.2	0.120	-0.1	0.645	0.2
Lab708	0.178	0.1	0.144	0.2	0.083	0.0	0.051	0.0	0.058	0.5	0.081	0.2	0.161	-0.2	0.131	0.2	0.670	0.4

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Acetamiprid	z score (FFP-RSD 25 %)	Chlorantraniprole	z score (FFP-RSD 25 %)	Chlorpropham	z score (FFP-RSD 25 %)	Chlorpyrifos	z score (FFP-RSD 25 %)	Chlothianidin	z score (FFP-RSD 25 %)	Diazinon	z score (FFP-RSD 25 %)	Difenoconazole	z score (FFP-RSD 25 %)	Dimethoate	z score (FFP-RSD 25 %)	Fenamidone	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.01**		**0.010**		**0.003**		**0.010**	
Robust mean (mg/kg)	**0.17**		**0.14**		**0.08**		**0.05**		**0.05**		**0.08**		**0.17**		**0.12**		**0.62**	
Lab710	0.178	0.1	0.141	0.1	0.085	0.1	0.054	0.2	0.056	0.3	0.071	-0.3	0.128	-1.0	0.132	0.3	0.580	-0.2
Lab712	0.162	-0.3	0.123	-0.4	0.080	-0.2	0.047	-0.3	0.047	-0.4	0.066	-0.5	0.153	-0.4	0.104	-0.6	0.671	0.4
Lab714	0.174	0.0	0.080	-1.6	ND	-3.5	0.023	-2.2	0.053	0.1	0.032	-2.3	0.125	-1.0	0.119	-0.2	0.425	-1.2
Lab716	0.130	-1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.130	-0.9	NA	NA	NA	NA
Lab718	0.197	0.5	0.136	0.0	0.085	0.1	0.031	-1.6	0.056	0.3	0.096	1.0	0.199	0.7	0.131	0.2	0.773	1.0
Lab720	0.152	-0.5	0.100	-1.1	0.099	0.7	0.074	1.8	0.050	-0.2	0.087	0.5	0.188	0.5	0.152	0.9	0.720	0.7
Lab722	0.145	-0.7	0.126	-0.3	NA	NA	0.056	0.4	0.051	-0.1	0.082	0.3	0.166	-0.1	0.114	-0.3	0.673	0.4
Lab724	NA	NA	NA	NA	0.049	-1.7	0.022	-2.3	NA	NA	0.051	-1.3	0.104	-1.5	0.086	-1.2	0.513	-0.7
Lab726	0.190	0.4	0.123	-0.4	0.077	-0.3	0.042	-0.7	0.049	-0.2	0.065	-0.6	0.178	0.2	0.127	0.1	0.587	-0.2
Lab728	0.152	-0.5	0.113	-0.7	0.068	-0.8	0.034	-1.3	0.055	0.2	0.056	-1.1	0.157	-0.3	0.122	-0.1	0.525	-0.6
Lab730	0.151	-0.5	0.164	0.8	0.101	0.8	0.055	0.3	0.060	0.6	0.085	0.4	0.170	0.0	0.130	0.2	0.611	0.0
Lab732	0.172	0.0	NA	NA	NA	NA	NA	NA	0.052	0.0	NA	NA	0.231	1.5	0.117	-0.2	0.609	0.0
Lab734	0.164	-0.2	0.120	-0.5	0.076	-0.4	0.046	-0.4	0.046	-0.5	0.074	-0.1	0.156	-0.3	0.120	-0.1	0.566	-0.3
Lab736	0.166	-0.2	0.102	-1.0	ND	-3.5	0.049	-0.1	0.056	0.3	0.084	0.4	0.143	-0.6	0.127	0.1	0.581	-0.2
Lab738	ND	-3.8	NA	NA	0.052	-1.5	0.021	-2.3	ND	-3.2	0.570	5.0	3.040	5.0	1.016	5.0	0.348	-1.7
Lab740	0.163	-0.3	0.186	1.5	0.123	1.9	0.076	2.0	0.051	-0.1	0.116	2.1	0.242	1.7	0.125	0.0	0.760	0.9
Lab742	0.189	0.3	0.127	-0.3	0.082	-0.1	0.054	0.2	0.050	-0.2	0.060	-0.9	0.150	-0.4	0.115	-0.3	0.635	0.1
Lab744	0.180	0.1	0.223	2.6	0.093	0.4	0.055	0.3	0.051	-0.1	0.090	0.7	0.160	-0.2	0.125	0.0	0.649	0.2
Lab746	0.165	-0.2	NA	NA	0.079	-0.2	0.046	-0.4	0.047	-0.4	0.069	-0.4	0.134	-0.8	0.125	0.0	0.561	-0.4
Lab748	0.173	0.0	NA	NA	0.042	-2.0	0.024	-2.1	0.057	0.4	0.032	-2.3	0.065	-2.5	0.120	-0.1	0.744	0.8
Lab750	0.209	0.8	0.157	0.6	0.091	0.3	0.055	0.3	0.059	0.5	0.075	-0.1	0.161	-0.2	0.141	0.6	0.516	-0.6
Lab752	0.164	-0.2	0.119	-0.5	0.083	0.0	0.046	-0.4	0.044	-0.6	0.072	-0.2	0.146	-0.5	0.113	-0.4	0.592	-0.2
Lab754	0.115	-1.4	0.122	-0.4	0.093	0.4	0.052	0.1	0.037	-1.2	0.075	-0.1	0.155	-0.3	0.079	-1.4	0.553	-0.4
Lab756	0.183	0.2	0.130	-0.2	0.081	-0.1	0.026	-2.0	0.057	0.4	0.082	0.3	0.147	-0.5	0.132	0.3	0.684	0.4
Lab758	0.186	0.3	0.148	0.4	0.080	-0.2	0.062	0.9	0.053	0.1	0.080	0.2	0.182	0.3	0.137	0.4	0.766	1.0
Lab760	0.179	0.1	0.131	-0.1	0.088	0.2	0.053	0.2	0.056	0.3	0.074	-0.1	0.167	0.0	0.135	0.4	0.614	0.0
Lab762	NA	NA	NA	NA	0.087	0.1	0.051	0.0	NA	NA	0.076	0.0	0.170	0.0	NA	NA	NA	NA
Lab764	0.168	-0.1	0.145	0.3	0.081	-0.1	0.049	-0.1	0.053	0.1	0.069	-0.4	0.173	0.1	0.128	0.1	0.677	0.4
Lab766	0.139	-0.8	0.157	0.6	0.176	4.4	0.044	-0.5	0.039	-1.0	0.072	-0.2	0.249	1.9	0.077	-1.5	0.540	-0.5
Lab768	0.148	-0.6	0.128	-0.2	0.087	0.1	0.042	-0.7	0.065	1.0	0.079	0.1	0.148	-0.5	0.130	0.2	0.564	-0.3
Lab770	0.173	0.0	0.179	1.3	0.089	0.2	0.059	0.6	0.062	0.8	0.078	0.1	0.180	0.3	0.136	0.4	0.643	0.2

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Acetamiprid	z score (FFP-RSD 25 %)	Chlorantraniprole	z score (FFP-RSD 25 %)	Chlorpropham	z score (FFP-RSD 25 %)	Chlorpyrifos	z score (FFP-RSD 25 %)	Chlothianidin	z score (FFP-RSD 25 %)	Diazinon	z score (FFP-RSD 25 %)	Difenoconazole	z score (FFP-RSD 25 %)	Dimethoate	z score (FFP-RSD 25 %)	Fenamidone	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.01**		**0.010**		**0.003**		**0.010**	
Robust mean (mg/kg)	**0.17**		**0.14**		**0.08**		**0.05**		**0.05**		**0.08**		**0.17**		**0.12**		**0.62**	
Lab772	0.140	-0.8	0.130	-0.2	0.080	-0.2	0.040	-0.9	0.040	-0.9	0.060	-0.9	0.160	-0.2	0.140	0.5	ND	-3.9
Lab774	0.246	1.7	NA	NA	0.126	2.0	0.066	1.2	0.063	0.8	0.091	0.8	0.197	0.7	0.153	0.9	NA	NA
Lab776	NA	NA	NA	NA	0.098	0.7	0.061	0.8	NA	NA	0.084	0.4	0.157	-0.3	0.122	-0.1	0.592	-0.2
Lab778	0.146	-0.6	0.106	-0.9	0.057	-1.3	0.039	-0.9	0.045	-0.5	0.054	-1.2	0.104	-1.5	0.110	-0.4	0.394	-1.4
Lab780	0.139	-0.8	NA	NA	NA	NA	0.056	0.4	0.043	-0.7	0.089	0.7	0.000	5.0	0.077	-1.5	0.596	-0.1
Lab782	0.214	0.9	0.170	1.0	0.116	1.5	0.065	1.1	0.051	-0.1	0.106	1.5	0.261	2.2	0.153	0.9	0.864	1.6
Lab784	0.173	0.0	0.126	-0.3	0.074	-0.5	0.049	-0.2	0.049	-0.2	0.071	-0.3	0.150	-0.4	0.122	-0.1	0.558	-0.4
Lab786	0.162	-0.3	0.119	-0.5	0.070	-0.7	0.039	-1.0	0.045	-0.6	0.061	-0.8	0.123	-1.1	0.125	0.0	0.552	-0.4
Lab788	0.210	0.8	0.146	0.3	0.056	-1.4	0.044	-0.6	0.064	0.9	0.096	1.0	0.245	1.8	0.138	0.5	0.674	0.4
Lab792	0.163	-0.3	0.117	-0.6	0.071	-0.6	0.045	-0.5	0.033	-1.5	0.064	-0.7	0.186	0.4	0.113	-0.4	0.582	-0.2
Lab794	0.165	-0.2	0.127	-0.3	0.080	-0.2	0.046	-0.4	0.040	-0.9	0.075	-0.1	0.150	-0.4	0.125	0.0	0.552	-0.4
Lab796	0.145	-0.7	0.148	0.4	0.079	-0.2	0.053	0.2	0.049	-0.2	0.076	0.0	0.120	-1.2	0.118	-0.2	0.635	0.1
Lab798	0.150	-0.6	NA	NA	0.084	0.0	0.053	0.2	NA	NA	0.058	-1.0	0.210	1.0	0.150	0.8	0.540	-0.5
Lab800	0.140	-0.8	0.102	-1.0	0.079	-0.2	0.042	-0.7	0.044	-0.6	0.071	-0.3	0.126	-1.0	0.106	-0.6	0.491	-0.8
Lab802	0.224	1.1	0.134	-0.1	0.080	-0.2	0.051	0.0	0.061	0.7	0.073	-0.2	0.227	1.4	0.114	-0.3	0.652	0.2
Lab804	0.160	-0.3	0.130	-0.2	0.085	0.1	0.045	-0.5	0.044	-0.6	0.072	-0.2	0.150	-0.4	0.120	-0.1	0.550	-0.4
Lab810	0.344	3.9	0.151	0.4	0.089	0.2	0.049	-0.1	0.057	0.4	0.068	-0.4	0.260	2.2	0.250	4.1	0.599	-0.1
Lab814	0.220	1.1	ND	-3.7	0.086	0.1	0.051	0.0	0.074	1.7	0.078	0.1	0.165	-0.1	0.136	0.4	0.994	2.5
Lab816	NA	NA	0.115	-0.6	0.085	0.1	0.048	-0.2	NA	NA	0.072	-0.3	0.160	-0.2	0.105	-0.6	0.653	0.2
Lab818	0.163	-0.3	0.124	-0.3	0.077	-0.3	0.039	-0.9	0.047	-0.4	0.067	-0.5	0.138	-0.7	0.119	-0.2	0.499	-0.8
Lab820	0.160	-0.3	0.130	-0.2	0.077	-0.3	0.040	-0.9	0.035	-1.3	0.064	-0.7	0.150	-0.4	0.110	-0.4	0.550	-0.4
Lab822	NA	NA	NA	NA	0.065	-0.9	0.053	0.2	NA	NA	0.057	-1.0	NA	NA	0.114	-0.3	NA	NA
Lab824	0.190	0.4	0.155	0.6	0.087	0.1	0.050	-0.1	0.050	-0.2	0.075	-0.1	0.160	-0.2	0.170	1.5	0.660	0.3
Lab826	0.190	0.4	0.140	0.1	0.095	0.5	0.060	0.7	0.055	0.2	0.080	0.2	0.170	0.0	0.130	0.2	0.600	-0.1
Lab828	0.153	-0.5	0.110	-0.8	0.065	-0.9	0.045	-0.4	0.048	-0.3	0.061	-0.8	0.126	-1.0	0.122	-0.1	0.450	-1.1
Lab830	0.170	-0.1	0.110	-0.8	0.085	0.1	0.049	-0.1	0.064	0.9	0.079	0.1	0.180	0.3	0.120	-0.1	0.570	-0.3
Lab834	0.130	-1.0	0.790	5.0	0.070	-0.7	0.030	-1.6	NA	NA	0.050	-1.4	0.120	-1.2	0.090	-1.1	NA	NA
Lab836	0.162	-0.3	0.136	0.0	0.083	0.0	0.037	-1.1	0.049	-0.2	0.072	-0.2	0.157	-0.3	0.120	-0.1	0.609	0.0
Lab838	0.182	0.2	0.169	1.0	0.087	0.1	0.052	0.1	0.057	0.4	0.079	0.1	0.153	-0.4	0.129	0.2	0.591	-0.2
Lab840	0.193	0.4	0.139	0.1	0.100	0.8	0.062	0.9	0.057	0.4	0.091	0.8	0.191	0.5	0.140	0.5	0.737	0.8
Lab844	0.160	-0.3	0.130	-0.2	0.100	0.8	0.045	-0.5	0.047	-0.4	0.079	0.1	0.170	0.0	0.110	-0.4	0.420	-1.3

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Acetamiprid	z score (FFP-RSD 25 %)	Chlorantraniprole	z score (FFP-RSD 25 %)	Chlorpropham	z score (FFP-RSD 25 %)	Chlorpyrifos	z score (FFP-RSD 25 %)	Chlothianidin	z score (FFP-RSD 25 %)	Diazinon	z score (FFP-RSD 25 %)	Difenoconazole	z score (FFP-RSD 25 %)	Dimethoate	z score (FFP-RSD 25 %)	Fenamidone	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.01**		**0.010**		**0.003**		**0.010**	
Robust mean (mg/kg)	**0.17**		**0.14**		**0.08**		**0.05**		**0.05**		**0.08**		**0.17**		**0.12**		**0.62**	
Lab848	0.188	0.3	0.171	1.0	0.094	0.5	0.062	0.9	0.055	0.2	0.082	0.3	0.196	0.6	0.133	0.3	0.708	0.6
Lab850	0.170	-0.1	0.282	4.3	0.084	0.0	0.070	1.5	0.064	0.9	0.091	0.8	0.193	0.6	0.081	-1.4	0.966	2.3
Lab852	0.182	0.2	0.141	0.2	0.092	0.4	0.056	0.4	0.053	0.0	0.085	0.4	0.190	0.5	0.135	0.4	0.592	-0.2
Lab854	0.199	0.6	NA	NA	0.059	-1.2	0.051	0.0	0.055	0.2	0.087	0.5	0.381	5.0	0.098	-0.8	NA	NA
Lab856	NA	NA	NA	NA	NA	NA	0.013	-3.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab858	0.200	0.6	0.142	0.2	0.088	0.2	0.052	0.1	0.054	0.1	0.067	-0.5	0.168	0.0	0.129	0.2	0.615	0.0
Lab862	0.236	1.4	0.143	0.2	0.072	-0.6	0.044	-0.5	0.041	-0.9	0.067	-0.5	0.127	-1.0	0.118	-0.2	0.603	-0.1
Lab866	0.221	1.1	0.195	1.7	0.082	-0.1	0.050	-0.1	0.058	0.5	0.083	0.3	0.110	-1.4	0.155	1.0	0.500	-0.7
Lab868	0.210	0.8	0.170	1.0	0.080	-0.2	ND	-3.2	NA	NA	0.070	-0.3	0.130	-0.9	0.090	-1.1	0.530	-0.6
Lab870	0.149	-0.6	0.160	0.7	0.068	-0.7	0.041	-0.8	0.041	-0.8	0.078	0.1	0.149	-0.5	0.103	-0.7	0.753	0.9
Lab872	0.163	-0.3	0.127	-0.3	0.095	0.5	0.048	-0.2	0.055	0.2	0.085	0.4	0.169	0.0	0.115	-0.3	0.562	-0.3
Lab874	NA	NA	NA	NA	0.083	0.0	0.052	0.1	NA	NA	0.075	-0.1	0.162	-0.2	NA	NA	NA	NA
Lab876	0.181	0.2	0.133	-0.1	0.067	-0.8	0.060	0.7	0.051	-0.1	0.060	-0.9	0.134	-0.8	0.111	-0.4	0.600	-0.1
Lab878	0.064	-2.5	0.094	-1.2	0.094	0.5	0.049	-0.1	0.029	-1.8	0.077	0.0	0.277	2.6	0.138	0.5	0.740	0.8
Lab880	0.161	-0.3	0.135	0.0	0.091	0.3	0.056	0.4	0.058	0.5	0.087	0.5	0.197	0.7	0.116	-0.3	0.633	0.1
Lab882	0.151	-0.5	NA	NA	0.095	0.5	0.047	-0.3	0.044	-0.6	0.070	-0.4	0.116	-1.3	0.112	-0.4	0.509	-0.7
Lab884	0.188	0.3	0.212	2.2	0.077	-0.3	0.046	-0.4	0.053	0.1	0.080	0.2	0.185	0.4	0.069	-1.8	NA	NA
Lab886	0.172	0.0	NA	NA	ND	-3.5	0.024	-2.1	0.048	-0.3	NA	NA	0.094	-1.8	0.134	0.3	NA	NA
Lab888	NA	NA	NA	NA	0.074	-0.5	0.045	-0.5	NA	NA	0.065	-0.6	0.152	-0.4	0.104	-0.6	0.587	-0.2
Lab890	ND	-3.8	0.157	0.6	ND	-3.5	0.040	-0.9	ND	-3.2	0.100	1.2	1.490	5.0	0.099	-0.8	ND	-3.9
Lab892	0.186	0.3	0.144	0.2	0.068	-0.8	0.045	-0.5	0.060	0.6	0.055	-1.1	0.185	0.4	0.127	0.1	0.704	0.6
Lab896	ND	-3.8	ND	-3.7	ND	-3.5	0.034	-1.4	ND	-3.2	0.059	-0.9	ND	-3.8	0.088	-1.2	ND	-3.9
Lab902	0.190	0.4	0.145	0.3	0.091	0.3	0.053	0.2	0.048	-0.3	0.075	-0.1	0.172	0.1	0.125	0.0	0.595	-0.1
Lab904	0.143	-0.7	0.113	-0.7	0.087	0.1	0.051	0.0	0.043	-0.7	0.076	0.0	0.157	-0.3	0.104	-0.6	0.570	-0.3
Lab906	Participation cancelled																	
Lab908	0.170	-0.1	0.110	-0.8	0.070	-0.7	0.040	-0.9	0.050	-0.2	0.070	-0.3	0.140	-0.7	0.120	-0.1	0.540	-0.5
Lab910	0.171	-0.1	0.137	0.0	0.092	0.4	0.066	1.2	0.050	-0.2	0.087	0.5	0.218	1.2	0.130	0.2	0.600	-0.1
Lab912	0.170	-0.1	NA	NA	NA	NA	0.042	-0.7	ND	-3.2	0.068	-0.4	0.130	-0.9	0.150	0.8	0.680	0.4
Lab914	0.157	-0.4	0.143	0.2	0.050	-1.6	0.046	-0.4	0.051	-0.1	0.077	0.0	0.153	-0.4	0.103	-0.7	ND	-3.9
Lab916	0.167	-0.2	0.108	-0.8	0.072	-0.6	0.050	-0.1	0.050	-0.2	0.074	-0.1	0.146	-0.5	0.105	-0.6	0.585	-0.2
Lab918	0.189	0.3	0.147	0.3	0.091	0.3	0.064	1.0	0.061	0.7	0.086	0.5	0.183	0.3	0.138	0.5	0.441	-1.1

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Acetamiprid	z score (FFP-RSD 25 %)	Chlorantraniprole	z score (FFP-RSD 25 %)	Chlorpropham	z score (FFP-RSD 25 %)	Chlorpyrifos	z score (FFP-RSD 25 %)	Chlothianidin	z score (FFP-RSD 25 %)	Diazinon	z score (FFP-RSD 25 %)	Difenoconazole	z score (FFP-RSD 25 %)	Dimethoate	z score (FFP-RSD 25 %)	Fenamidone	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.01**		**0.010**		**0.003**		**0.010**	
Robust mean (mg/kg)	**0.17**		**0.14**		**0.08**		**0.05**		**0.05**		**0.08**		**0.17**		**0.12**		**0.62**	
Lab920	0.149	-0.6	0.129	-0.2	0.090	0.3	0.045	-0.5	0.058	0.5	0.074	-0.1	0.160	-0.2	0.133	0.3	0.604	-0.1
Lab922	0.200	0.6	0.130	-0.2	0.090	0.3	0.055	0.3	0.055	0.2	0.079	0.1	0.150	-0.4	0.130	0.2	0.590	-0.2
Lab924	0.174	0.0	0.137	0.0	0.088	0.2	0.056	0.4	0.056	0.3	0.081	0.2	0.187	0.4	0.131	0.2	0.650	0.2
Lab926	0.200	0.6	0.115	-0.6	0.096	0.6	0.059	0.6	0.057	0.4	0.082	0.3	0.179	0.2	0.146	0.7	0.627	0.1
Lab928	0.171	-0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.161	-0.2	NA	NA	NA	NA
Lab930	0.160	-0.3	0.124	-0.3	0.088	0.2	0.054	0.2	0.042	-0.8	0.084	0.4	0.157	-0.3	0.126	0.1	NA	NA
Lab932	0.156	-0.4	0.105	-0.9	0.046	-1.8	0.047	-0.3	0.047	-0.4	0.066	-0.5	0.126	-1.0	0.112	-0.4	0.496	-0.8
Lab1116	0.190	0.4	ND	-3.7	ND	-3.5	0.060	0.7	ND	-3.2	0.090	0.7	ND	-3.8	0.120	-0.1	ND	-3.9

NA: Not analysed ND: Not detected (False negative)

Lab Code	Fluxapyroxad	z score (FFP-RSD 25 %)	Metaflumizone	z score (FFP-RSD 25 %)	Propamocarb	z score (FFP-RSD 25 %)	Propyzamide	z score (FFP-RSD 25 %)	Pyraclostrobin	z score (FFP-RSD 25 %)	Teflubenzuron	z score (FFP-RSD 25 %)	Trifloxystrobin	z score (FFP-RSD 25 %)	Triflumuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.01**		**0.01**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.54**		**0.21**		**0.170**		**0.08**		**0.08**		**0.110**		**0.230**		**0.47**	
Lab522	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab524	0.520	-0.1	NA	NA	NA	NA	0.084	0.0	0.069	-0.4	0.100	-0.4	0.210	-0.4	0.390	-0.7
Lab528	0.558	0.2	0.217	0.1	0.188	0.4	0.104	1.0	0.077	0.0	0.432	5.0	0.257	0.5	0.488	0.2
Lab530	0.536	0.0	0.265	1.1	0.176	0.1	0.078	-0.3	0.076	0.0	0.100	-0.4	0.238	0.1	0.510	0.4
Lab532	0.579	0.3	0.298	1.7	0.205	0.8	0.085	0.1	0.078	0.1	ND	-3.6	0.236	0.1	0.562	0.8
Lab534	0.534	0.0	0.195	-0.3	0.144	-0.6	0.100	0.8	0.095	1.0	0.155	1.6	0.245	0.3	0.412	-0.5
Lab536	NA	NA	0.231	0.4	0.154	-0.4	NA	NA	0.065	-0.6	0.100	-0.4	0.215	-0.3	0.452	-0.1
Lab538	NA	NA	0.220	0.2	0.220	1.2	0.110	1.3	0.067	-0.5	0.100	-0.4	0.190	-0.7	0.510	0.4
Lab540	0.567	0.2	0.261	1.0	0.203	0.8	0.089	0.3	0.077	0.0	0.119	0.3	0.273	0.7	0.548	0.7
Lab544	0.417	-0.9	0.109	-1.9	0.161	-0.2	0.067	-0.8	0.069	-0.4	0.110	0.0	0.199	-0.5	0.431	-0.3
Lab546	0.557	0.2	0.181	-0.5	0.164	-0.1	0.088	0.2	0.089	0.7	0.126	0.6	0.240	0.2	0.540	0.6
Lab548	0.488	-0.4	0.185	-0.5	0.148	-0.5	0.074	-0.4	0.064	-0.6	0.069	-1.5	0.212	-0.3	0.385	-0.7

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Fluxapyroxad	z score (FFP-RSD 25 %)	Metaflumizone	z score (FFP-RSD 25 %)	Propamocarb	z score (FFP-RSD 25 %)	Propyzamide	z score (FFP-RSD 25 %)	Pyraclostrobin	z score (FFP-RSD 25 %)	Teflubenzuron	z score (FFP-RSD 25 %)	Trifloxystrobin	z score (FFP-RSD 25 %)	Triflumuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.01**		**0.01**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.54**		**0.21**		**0.170**		**0.08**		**0.08**		**0.110**		**0.230**		**0.47**	
Lab550	ND	-3.9	ND	-3.8	0.160	-0.2	0.077	-0.3	0.083	0.4	0.090	-0.7	0.210	-0.4	0.380	-0.8
Lab552	NA	NA	NA	NA	0.112	-1.4	0.082	-0.1	0.094	0.9	0.104	-0.2	0.212	-0.3	NA	NA
Lab554	NA	NA	NA	NA	NA	NA	0.049	-1.6	0.118	2.2	NA	NA	0.131	-1.7	NA	NA
Lab556	0.564	0.2	0.224	0.3	0.147	-0.5	0.082	-0.1	0.071	-0.3	0.135	0.9	0.214	-0.3	0.457	-0.1
Lab558	0.463	-0.5	0.190	-0.4	0.214	1.0	0.077	-0.3	0.061	-0.8	0.136	0.9	0.196	-0.6	0.407	-0.5
Lab560	0.545	0.1	0.150	-1.1	0.185	0.3	0.091	0.4	0.071	-0.3	0.130	0.7	0.238	0.1	0.485	0.1
Lab562	0.680	1.1	0.159	-1.0	0.133	-0.9	0.096	0.6	0.078	0.1	0.098	-0.4	0.221	-0.2	0.581	1.0
Lab564	0.770	1.7	0.203	-0.1	0.171	0.0	0.079	-0.2	0.084	0.4	0.078	-1.2	0.286	1.0	0.449	-0.2
Lab566	0.482	-0.4	0.331	2.3	0.136	-0.8	0.081	-0.1	0.071	-0.3	0.103	-0.3	0.242	0.2	0.406	-0.5
Lab568	0.615	0.6	0.188	-0.4	0.225	1.3	0.065	-0.9	0.095	1.0	0.114	0.1	0.201	-0.5	0.542	0.6
Lab570	NA	NA	0.427	4.1	0.141	-0.7	0.104	1.0	0.076	0.0	0.139	1.1	0.253	0.4	0.509	0.3
Lab572	NA	NA	NA	NA	0.190	0.5	NA	NA	0.090	0.7	0.110	0.0	0.270	0.7	0.560	0.8
Lab574	NA	NA	NA	NA	0.143	-0.6	0.084	0.0	NA	NA	NA	NA	0.215	-0.3	NA	NA
Lab576	NA	NA	0.173	-0.7	0.090	-1.9	0.159	3.6	0.073	-0.2	ND	-3.6	ND	-3.8	ND	-3.9
Lab580	0.672	1.0	0.223	0.3	0.157	-0.3	0.082	-0.1	0.085	0.5	0.108	-0.1	0.251	0.4	0.524	0.5
Lab582	0.518	-0.1	0.244	0.7	0.163	-0.2	0.079	-0.2	0.072	-0.2	0.101	-0.3	0.242	0.2	0.652	1.6
Lab584	0.410	-0.9	0.190	-0.4	0.150	-0.5	0.071	-0.6	0.053	-1.2	0.082	-1.0	0.180	-0.9	0.370	-0.8
Lab586	0.679	1.1	0.256	0.9	0.143	-0.6	0.102	0.9	0.081	0.3	0.100	-0.4	0.232	0.0	0.443	-0.2
Lab588	0.500	-0.3	NA	NA	0.190	0.5	0.071	-0.6	0.087	0.6	0.210	3.6	0.280	0.9	0.420	-0.4
Lab590	0.545	0.1	0.193	-0.3	0.148	-0.5	0.084	0.0	0.083	0.4	0.113	0.1	0.242	0.2	0.483	0.1
Lab592	0.579	0.3	0.128	-1.6	0.138	-0.8	0.089	0.3	0.070	-0.3	0.096	-0.5	0.264	0.6	0.432	-0.3
Lab594	0.484	-0.4	0.092	-2.2	0.152	-0.4	0.064	-0.9	0.051	-1.3	0.071	-1.4	0.153	-1.3	0.139	-2.8
Lab596	0.402	-1.0	0.141	-1.3	0.177	0.2	0.072	-0.5	0.061	-0.8	0.107	-0.1	0.188	-0.7	0.451	-0.2
Lab598	0.468	-0.5	0.224	0.3	0.180	0.2	0.090	0.3	0.070	-0.3	0.101	-0.3	0.194	-0.6	ND	-3.9
Lab600	NA	NA	ND	-3.8	ND	-3.8	0.076	-0.3	NA	NA	NA	NA	0.172	-1.0	NA	NA
Lab602	0.410	-0.9	0.180	-0.6	0.083	-2.1	0.063	-1.0	0.065	-0.6	0.078	-1.2	0.200	-0.5	0.320	-1.3
Lab604	0.526	-0.1	0.228	0.3	0.156	-0.3	0.078	-0.3	0.075	-0.1	0.134	0.9	0.224	-0.1	0.530	0.5
Lab606	0.600	0.5	0.190	-0.4	0.150	-0.5	0.120	1.8	0.120	2.3	0.100	-0.4	0.290	1.0	0.540	0.6
Lab608	NA	NA	NA	NA	0.130	-0.9	NA	NA	0.120	2.3	NA	NA	NA	NA	NA	NA
Lab610	0.575	0.3	0.244	0.7	0.142	-0.7	0.074	-0.4	0.065	-0.6	0.095	-0.6	0.235	0.1	0.565	0.8
Lab612	NA	NA	NA	NA	NA	NA	0.095	0.6	NA	NA	NA	NA	NA	NA	NA	NA
Lab614	NA	NA	0.225	0.3	0.136	-0.8	0.083	0.0	0.065	-0.6	0.101	-0.3	0.246	0.3	0.593	1.1

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Fluxapyroxad	z score (FFP-RSD 25 %)	Metaflumizone	z score (FFP-RSD 25 %)	Propamocarb	z score (FFP-RSD 25 %)	Propyzamide	z score (FFP-RSD 25 %)	Pyraclostrobin	z score (FFP-RSD 25 %)	Teflubenzuron	z score (FFP-RSD 25 %)	Trifloxystrobin	z score (FFP-RSD 25 %)	Triflumuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.01**		**0.01**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.54**		**0.21**		**0.170**		**0.08**		**0.08**		**0.110**		**0.230**		**0.47**	
Lab616	0.593	0.4	0.152	-1.1	0.176	0.1	0.087	0.2	0.092	0.8	0.099	-0.4	0.236	0.1	0.465	0.0
Lab618	0.452	-0.6	0.212	0.0	0.180	0.2	0.074	-0.5	0.073	-0.2	0.095	-0.5	0.211	-0.3	0.385	-0.7
Lab620	0.398	-1.0	NA	NA	0.149	-0.5	0.064	-0.9	0.052	-1.3	0.072	-1.4	0.156	-1.3	0.323	-1.2
Lab622	0.641	0.8	0.233	0.4	0.141	-0.7	0.082	-0.1	0.070	-0.3	0.093	-0.6	0.214	-0.3	0.444	-0.2
Lab624	0.522	-0.1	0.179	-0.6	0.177	0.2	0.094	0.5	0.056	-1.1	0.098	-0.4	0.263	0.6	0.378	-0.8
Lab626	0.727	1.4	0.401	3.6	0.165	-0.1	0.075	-0.4	0.102	1.4	0.130	0.7	0.248	0.3	0.651	1.6
Lab628	1.252	5.0	NA	NA	0.021	-3.5	0.087	0.2	0.164	4.6	0.153	1.6	0.614	5.0	ND	-3.9
Lab632	0.888	2.6	0.278	1.3	0.170	0.0	0.105	1.0	0.078	0.1	0.095	-0.5	0.248	0.3	0.828	3.1
Lab634	0.637	0.8	0.160	-0.9	0.207	0.9	0.099	0.8	0.084	0.4	0.126	0.6	0.253	0.4	0.502	0.3
Lab636	0.531	0.0	0.263	1.0	0.139	-0.7	0.075	-0.4	0.070	-0.3	0.090	-0.7	0.233	0.0	0.489	0.2
Lab638	NA	NA	NA	NA	NA	NA	NA	NA	0.082	0.3	NA	NA	0.220	-0.2	NA	NA
Lab640	0.512	-0.2	0.338	2.4	0.159	-0.3	0.067	-0.8	0.070	-0.3	0.104	-0.2	0.189	-0.7	0.445	-0.2
Lab642	0.516	-0.2	0.153	-1.1	0.167	-0.1	0.071	-0.6	0.067	-0.5	0.093	-0.6	0.217	-0.2	0.436	-0.3
Lab644	0.491	-0.3	0.148	-1.2	0.160	-0.2	0.075	-0.4	0.075	-0.1	0.100	-0.4	0.216	-0.2	0.488	0.2
Lab646	0.497	-0.3	0.151	-1.1	0.159	-0.3	0.074	-0.4	0.072	-0.2	0.095	-0.6	0.211	-0.3	0.466	0.0
Lab648	0.481	-0.4	0.158	-1.0	0.145	-0.6	0.075	-0.4	0.081	0.2	0.123	0.5	0.216	-0.2	0.615	1.2
Lab650	NA	NA	NA	NA	0.170	0.0	0.090	0.3	0.080	0.2	0.120	0.4	0.240	0.2	0.490	0.2
Lab654	0.530	0.0	0.226	0.3	0.207	0.9	0.092	0.4	0.081	0.3	0.106	-0.1	0.211	-0.3	0.487	0.2
Lab656	NA	NA	NA	NA	0.110	-1.4	0.112	1.4	0.073	-0.2	NA	NA	0.230	0.0	0.230	-2.0
Lab658	NA	NA	NA	NA	NA	NA	0.091	0.4	0.097	1.1	NA	NA	0.250	0.3	NA	NA
Lab660	NA	NA	NA	NA	0.180	0.2	0.082	-0.1	0.077	0.0	NA	NA	0.241	0.2	0.481	0.1
Lab662	NA	NA	NA	NA	0.150	-0.5	0.094	0.5	0.080	0.2	NA	NA	0.225	-0.1	0.451	-0.2
Lab664	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.238	0.1	NA	NA
Lab666	0.582	0.3	0.180	-0.6	0.150	-0.5	NA	NA	0.076	0.0	0.122	0.4	0.265	0.6	0.442	-0.2
Lab668	0.640	0.8	ND	-3.8	0.220	1.2	0.075	-0.4	0.096	1.0	ND	-3.6	0.250	0.3	0.620	1.3
Lab670	0.537	0.0	0.164	-0.9	0.180	0.2	0.078	-0.3	0.068	-0.4	0.100	-0.4	0.220	-0.2	0.438	-0.3
Lab672	NA	NA	NA	NA	NA	NA	0.086	0.1	0.077	0.0	0.098	-0.4	0.268	0.7	0.435	-0.3
Lab674	0.540	0.0	0.220	0.2	0.130	-0.9	0.080	-0.2	0.066	-0.5	0.094	-0.6	0.240	0.2	0.360	-0.9
Lab676	0.585	0.4	0.141	-1.3	0.170	0.0	0.084	0.0	0.081	0.3	0.084	-0.9	0.256	0.4	0.453	-0.1
Lab678	NA	NA	0.210	0.0	0.180	0.2	0.082	-0.1	0.087	0.6	0.110	0.0	0.260	0.5	0.520	0.4
Lab680	0.531	0.0	0.164	-0.9	0.177	0.2	0.088	0.2	0.072	-0.2	0.115	0.2	0.216	-0.2	0.389	-0.7
Lab682	NA	NA	0.173	-0.7	0.174	0.1	0.094	0.5	0.069	-0.4	0.112	0.1	0.230	0.0	0.610	1.2

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Fluxapyroxad	z score (FFP-RSD 25 %)	Metaflumizone	z score (FFP-RSD 25 %)	Propamocarb	z score (FFP-RSD 25 %)	Propyzamide	z score (FFP-RSD 25 %)	Pyraclostrobin	z score (FFP-RSD 25 %)	Teflubenzuron	z score (FFP-RSD 25 %)	Trifloxystrobin	z score (FFP-RSD 25 %)	Triflumuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.01**		**0.01**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.54**		**0.21**		**0.170**		**0.08**		**0.08**		**0.110**		**0.230**		**0.47**	
Lab684	0.848	2.3	0.193	-0.3	0.158	-0.3	0.095	0.6	0.075	-0.1	0.089	-0.8	0.355	2.2	0.483	0.1
Lab686	0.534	0.0	0.227	0.3	0.171	0.0	0.098	0.7	0.079	0.1	0.112	0.1	0.251	0.4	0.488	0.2
Lab688	NA	NA	NA	NA	NA	NA	0.087	0.2	NA	NA	NA	NA	0.280	0.9	NA	NA
Lab690	0.474	-0.5	0.175	-0.7	0.209	0.9	0.074	-0.4	0.068	-0.4	0.103	-0.3	0.198	-0.6	0.418	-0.4
Lab692	0.504	-0.2	0.234	0.5	0.175	0.1	0.099	0.8	0.069	-0.4	0.098	-0.4	0.243	0.2	0.469	0.0
Lab694	NA	NA	NA	NA	0.189	0.4	0.089	0.3	0.079	0.1	ND	-3.6	0.250	0.3	0.520	0.4
Lab696	NA	NA	NA	NA	0.937	5.0	0.089	0.3	0.077	0.0	NA	NA	0.275	0.8	0.699	2.0
Lab698	0.515	-0.2	0.283	1.4	0.205	0.8	0.070	-0.6	0.095	1.0	0.128	0.7	0.260	0.5	0.243	-1.9
Lab700	0.496	-0.3	0.207	-0.1	0.161	-0.2	0.077	-0.3	0.076	0.0	0.160	1.8	0.243	0.2	0.421	-0.4
Lab702	0.572	0.3	0.206	-0.1	0.186	0.4	0.112	1.4	0.081	0.3	0.111	0.0	0.218	-0.2	0.459	-0.1
Lab704	0.539	0.0	0.270	1.2	0.134	-0.9	0.097	0.7	0.086	0.5	0.142	1.2	0.228	0.0	0.527	0.5
Lab706	ND	-3.9	0.200	-0.2	0.225	1.3	0.075	-0.4	0.074	-0.1	0.120	0.4	0.220	-0.2	0.450	-0.2
Lab708	0.527	-0.1	0.291	1.6	0.185	0.3	0.081	-0.1	0.083	0.4	0.112	0.1	0.257	0.5	0.515	0.4
Lab710	0.470	-0.5	0.279	1.3	0.147	-0.5	0.081	-0.1	0.066	-0.6	0.110	0.0	0.230	0.0	0.490	0.2
Lab712	0.534	0.0	0.170	-0.8	0.146	-0.6	0.074	-0.4	0.068	-0.4	0.184	2.7	0.222	-0.1	0.484	0.1
Lab714	0.431	-0.8	0.115	-1.8	0.207	0.9	0.073	-0.5	0.050	-1.4	0.055	-2.0	0.139	-1.6	0.347	-1.0
Lab716	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.150	-1.4	NA	NA
Lab718	0.524	-0.1	0.262	1.0	0.116	-1.3	0.092	0.4	0.076	0.0	0.119	0.3	0.242	0.2	0.469	0.0
Lab720	0.675	1.0	0.215	0.1	0.186	0.4	0.088	0.2	0.080	0.2	0.138	1.0	0.258	0.5	0.690	1.9
Lab722	0.638	0.8	0.236	0.5	0.118	-1.2	0.101	0.9	0.074	-0.1	0.110	0.0	0.240	0.2	0.424	-0.4
Lab724	NA	NA	NA	NA	NA	NA	0.067	-0.8	ND	-3.5	NA	NA	0.181	-0.9	NA	NA
Lab726	0.531	0.0	0.193	-0.3	0.140	-0.7	0.071	-0.6	0.083	0.4	0.114	0.1	0.198	-0.6	0.493	0.2
Lab728	0.531	0.0	0.206	-0.1	0.221	1.2	0.073	-0.5	0.072	-0.2	0.089	-0.8	0.157	-1.3	0.474	0.0
Lab730	0.558	0.2	0.210	0.0	0.200	0.7	0.100	0.8	0.090	0.7	0.142	1.2	0.240	0.2	0.480	0.1
Lab732	NA	NA	NA	NA	NA	NA	NA	NA	0.050	-1.4	0.062	-1.7	0.191	-0.7	0.375	-0.8
Lab734	0.480	-0.4	0.240	0.6	0.177	0.2	0.077	-0.3	0.075	-0.1	0.094	-0.6	0.240	0.2	0.410	-0.5
Lab736	NA	NA	0.173	-0.7	0.127	-1.0	0.079	-0.2	0.072	-0.2	0.101	-0.3	0.221	-0.2	0.591	1.0
Lab738	NA	NA	ND	-3.8	0.064	-2.5	0.043	-1.9	ND	-3.5	NA	NA	NA	NA	NA	NA
Lab740	NA	NA	0.256	0.9	0.143	-0.6	0.107	1.1	0.117	2.1	NA	NA	0.347	2.0	0.651	1.6
Lab742	0.519	-0.1	0.150	-1.1	0.180	0.2	0.091	0.4	0.072	-0.2	0.110	0.0	0.241	0.2	0.485	0.1
Lab744	0.531	0.0	0.200	-0.2	0.153	-0.4	0.100	0.8	0.082	0.3	0.142	1.2	0.264	0.6	0.427	-0.4
Lab746	NA	NA	NA	NA	0.148	-0.5	0.078	-0.3	0.061	-0.8	0.116	0.2	0.212	-0.3	NA	NA

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Fluxapyroxad	z score (FFP-RSD 25 %)	Metaflumizone	z score (FFP-RSD 25 %)	Propamocarb	z score (FFP-RSD 25 %)	Propyzamide	z score (FFP-RSD 25 %)	Pyraclostrobin	z score (FFP-RSD 25 %)	Teflubenzuron	z score (FFP-RSD 25 %)	Trifloxystrobin	z score (FFP-RSD 25 %)	Triflumuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.01**		**0.01**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.54**		**0.21**		**0.170**		**0.08**		**0.08**		**0.110**		**0.230**		**0.47**	
Lab748	NA	NA	NA	NA	0.197	0.6	0.043	-1.9	0.058	-1.0	NA	NA	NA	NA	0.302	-1.4
Lab750	0.574	0.3	0.196	-0.3	0.160	-0.2	0.105	1.0	0.079	0.1	0.127	0.6	0.223	-0.1	0.299	-1.4
Lab752	0.503	-0.2	0.164	-0.9	0.174	0.1	0.101	0.9	0.075	-0.1	0.452	5.0	0.214	-0.3	0.426	-0.4
Lab754	NA	NA	0.210	0.0	0.100	-1.7	0.078	-0.3	0.091	0.8	0.135	0.9	0.218	-0.2	0.448	-0.2
Lab756	0.539	0.0	0.166	-0.8	0.160	-0.2	0.088	0.2	0.060	-0.9	0.088	-0.8	0.189	-0.7	0.253	-1.8
Lab758	0.492	-0.3	0.220	0.2	0.348	4.2	0.073	-0.5	0.076	0.0	0.102	-0.3	0.235	0.1	0.564	0.8
Lab760	0.610	0.6	0.173	-0.7	0.180	0.2	0.085	0.1	0.071	-0.3	0.116	0.2	0.226	-0.1	0.445	-0.2
Lab762	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.229	0.0	NA	NA
Lab764	0.568	0.2	0.233	0.4	0.165	-0.1	0.074	-0.4	0.064	-0.6	0.116	0.2	0.220	-0.2	0.482	0.1
Lab766	NA	NA	NA	NA	NA	NA	0.109	1.2	0.124	2.5	NA	NA	0.312	1.4	NA	NA
Lab768	0.542	0.0	0.282	1.4	0.215	1.0	0.091	0.4	0.073	-0.2	0.108	-0.1	0.218	-0.2	0.579	0.9
Lab770	0.549	0.1	0.192	-0.3	0.159	-0.3	0.084	0.0	0.075	-0.1	0.137	1.0	0.245	0.3	0.485	0.1
Lab772	NA	NA	0.170	-0.8	0.150	-0.5	0.080	-0.2	0.070	-0.3	NA	NA	0.220	-0.2	0.540	0.6
Lab774	NA	NA	NA	NA	0.224	1.3	NA	NA	0.090	0.7	NA	NA	0.277	0.8	NA	NA
Lab776	NA	NA	NA	NA	NA	NA	0.090	0.3	NA	NA	NA	NA	0.235	0.1	NA	NA
Lab778	0.340	-1.5	0.227	0.3	0.214	1.0	0.073	-0.5	0.052	-1.3	0.107	-0.1	0.181	-0.9	0.335	-1.1
Lab780	NA	NA	NA	NA	0.146	-0.6	0.083	0.0	0.089	0.7	0.112	0.1	0.245	0.3	0.469	0.0
Lab782	NA	NA	0.313	2.0	0.193	0.5	0.100	0.8	0.121	2.4	0.164	2.0	0.341	1.9	0.552	0.7
Lab784	0.470	-0.5	0.249	0.7	0.189	0.4	0.075	-0.4	0.073	-0.2	0.103	-0.3	0.230	0.0	0.415	-0.5
Lab786	0.467	-0.5	0.242	0.6	0.168	-0.1	0.067	-0.8	0.066	-0.6	0.085	-0.9	0.269	0.7	0.461	-0.1
Lab788	0.460	-0.6	0.202	-0.1	0.158	-0.3	0.060	-1.1	0.090	0.7	0.121	0.4	0.228	0.0	0.509	0.3
Lab792	0.466	-0.5	0.241	0.6	0.154	-0.4	0.071	-0.6	0.089	0.7	0.068	-1.5	0.233	0.0	0.455	-0.1
Lab794	0.493	-0.3	0.169	-0.8	0.172	0.0	0.076	-0.3	0.068	-0.4	0.101	-0.3	0.204	-0.5	0.443	-0.2
Lab796	0.525	-0.1	0.241	0.6	0.175	0.1	0.073	-0.5	0.074	-0.1	0.122	0.4	0.240	0.2	1.192	5.0
Lab798	NA	NA	NA	NA	0.210	0.9	0.086	0.1	0.073	-0.2	0.110	0.0	0.230	0.0	0.530	0.5
Lab800	NA	NA	NA	NA	0.142	-0.7	0.064	-0.9	0.046	-1.6	NA	NA	0.210	-0.4	NA	NA
Lab802	0.807	2.0	0.091	-2.3	0.160	-0.2	0.039	-2.1	0.061	-0.8	0.060	-1.8	0.244	0.2	0.519	0.4
Lab804	0.550	0.1	0.360	2.9	0.170	0.0	0.070	-0.6	0.080	0.2	0.110	0.0	0.200	-0.5	0.600	1.1
Lab810	0.593	0.4	0.183	-0.5	0.165	-0.1	0.078	-0.3	0.088	0.6	0.124	0.5	0.334	1.8	0.499	0.3
Lab814	0.505	-0.2	NA	NA	0.269	2.3	0.096	0.6	0.071	-0.3	ND	-3.6	0.246	0.3	ND	-3.9
Lab816	NA	NA	NA	NA	0.174	0.1	0.079	-0.2	NA	NA	NA	NA	0.214	-0.3	NA	NA
Lab818	0.413	-0.9	0.239	0.6	0.155	-0.4	0.074	-0.4	0.067	-0.5	0.081	-1.1	0.184	-0.8	0.382	-0.7

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Fluxapyroxad	z score (FFP-RSD 25 %)	Metaflumizone	z score (FFP-RSD 25 %)	Propamocarb	z score (FFP-RSD 25 %)	Propyzamide	z score (FFP-RSD 25 %)	Pyraclostrobin	z score (FFP-RSD 25 %)	Teflubenzuron	z score (FFP-RSD 25 %)	Trifloxystrobin	z score (FFP-RSD 25 %)	Triflumuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.01**		**0.01**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.54**		**0.21**		**0.170**		**0.08**		**0.08**		**0.110**		**0.230**		**0.47**	
Lab820	0.490	-0.3	0.340	2.5	0.190	0.5	0.076	-0.3	0.059	-0.9	0.130	0.7	0.140	-1.6	0.410	-0.5
Lab822	NA	NA	NA	NA	NA	NA	0.080	-0.2	NA	NA	NA	NA	NA	NA	NA	NA
Lab824	0.540	0.0	0.165	-0.9	0.205	0.8	0.085	0.1	0.080	0.2	0.100	-0.4	0.230	0.0	0.415	-0.5
Lab826	0.500	-0.3	0.280	1.3	0.180	0.2	0.085	0.1	0.072	-0.2	0.140	1.1	0.230	0.0	0.440	-0.2
Lab828	0.403	-1.0	0.126	-1.6	0.178	0.2	0.062	-1.0	0.060	-0.9	0.086	-0.9	0.179	-0.9	0.322	-1.3
Lab830	0.520	-0.1	NA	NA	0.160	-0.2	0.091	0.4	0.073	-0.2	0.170	2.2	0.228	0.0	NA	NA
Lab834	NA	NA	NA	NA	NA	NA	0.080	-0.2	NA	NA	NA	NA	0.150	-1.4	NA	NA
Lab836	0.558	0.2	0.173	-0.7	0.192	0.5	0.084	0.0	0.082	0.3	0.120	0.4	0.238	0.1	0.515	0.4
Lab838	0.499	-0.3	0.456	4.7	0.212	1.0	0.082	-0.1	0.081	0.3	0.091	-0.7	0.164	-1.2	0.373	-0.8
Lab840	1.135	4.5	0.193	-0.3	0.197	0.6	0.101	0.9	0.085	0.5	0.119	0.3	0.261	0.5	0.540	0.6
Lab844	0.590	0.4	NA	NA	0.160	-0.2	0.076	-0.3	0.054	-1.2	0.110	0.0	0.250	0.3	0.190	-2.4
Lab848	0.625	0.7	0.263	1.0	0.145	-0.6	0.100	0.8	0.088	0.6	0.122	0.4	0.272	0.7	0.570	0.9
Lab850	NA	NA	NA	NA	0.172	0.0	0.083	0.0	0.028	-2.5	NA	NA	0.239	0.2	NA	NA
Lab852	NA	NA	NA	NA	0.178	0.2	0.116	1.6	0.082	0.3	NA	NA	0.226	-0.1	0.458	-0.1
Lab854	NA	NA	NA	NA	NA	NA	0.083	0.0	NA	NA	NA	NA	NA	NA	NA	NA
Lab856	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab858	0.500	-0.3	0.255	0.9	0.202	0.7	0.081	-0.1	0.073	-0.2	0.107	-0.1	0.227	-0.1	0.437	-0.3
Lab862	NA	NA	0.199	-0.2	0.196	0.6	0.070	-0.6	0.082	0.3	0.157	1.7	0.239	0.1	0.441	-0.2
Lab866	NA	NA	NA	NA	0.264	2.2	0.079	-0.2	0.091	0.8	NA	NA	0.220	-0.2	0.751	2.4
Lab868	NA	NA	0.170	-0.8	0.220	1.2	0.070	-0.6	0.080	0.2	0.100	-0.4	0.180	-0.9	0.500	0.3
Lab870	NA	NA	0.166	-0.8	NA	NA	0.087	0.2	0.071	-0.3	0.097	-0.5	0.276	0.8	0.396	-0.6
Lab872	0.542	0.0	0.195	-0.3	0.200	0.7	0.088	0.2	0.079	0.1	0.105	-0.2	0.233	0.0	0.421	-0.4
Lab874	NA	NA	NA	NA	NA	NA	0.085	0.1	0.070	-0.3	NA	NA	0.226	-0.1	NA	NA
Lab876	0.512	-0.2	0.193	-0.3	0.186	0.4	0.074	-0.4	0.085	0.5	0.092	-0.7	0.190	-0.7	0.369	-0.9
Lab878	NA	NA	NA	NA	ND	-3.8	0.090	0.3	0.102	1.4	NA	NA	0.254	0.4	0.500	0.3
Lab880	0.548	0.1	0.247	0.7	0.222	1.2	0.086	0.1	0.072	-0.2	0.126	0.6	0.245	0.3	0.474	0.0
Lab882	0.604	0.5	NA	NA	0.125	-1.1	0.083	0.0	0.073	-0.2	NA	NA	0.221	-0.2	0.450	-0.2
Lab884	NA	NA	NA	NA	0.235	1.5	0.086	0.1	0.075	-0.1	0.197	3.2	0.222	-0.1	0.080	-3.3
Lab886	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.088	-0.8	NA	NA	ND	-3.9
Lab888	NA	NA	NA	NA	NA	NA	0.075	-0.4	NA	NA	NA	NA	0.209	-0.4	NA	NA
Lab890	ND	-3.9	ND	-3.8	ND	-3.8	ND	-3.5	0.065	-0.6	ND	-3.6	0.237	0.1	ND	-3.9
Lab892	ND	-3.9	0.156	-1.0	0.173	0.1	0.072	-0.5	0.085	0.5	0.110	0.0	0.257	0.5	0.551	0.7

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Fluxapyroxad	z score (FFP-RSD 25 %)	Metaflumizone	z score (FFP-RSD 25 %)	Propamocarb	z score (FFP-RSD 25 %)	Propyzamide	z score (FFP-RSD 25 %)	Pyraclostrobin	z score (FFP-RSD 25 %)	Teflubenzuron	z score (FFP-RSD 25 %)	Trifloxystrobin	z score (FFP-RSD 25 %)	Triflumuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.01**		**0.01**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.54**		**0.21**		**0.170**		**0.08**		**0.08**		**0.110**		**0.230**		**0.47**	
Lab896	ND	-3.9	ND	-3.8	ND	-3.8	ND	-3.5	ND	-3.5	ND	-3.6	ND	-3.8	ND	-3.9
Lab902	0.570	0.3	0.170	-0.8	0.170	0.0	0.077	-0.3	0.082	0.3	0.095	-0.5	0.232	0.0	0.472	0.0
Lab904	0.360	-1.3	0.199	-0.2	0.160	-0.2	0.085	0.1	0.063	-0.7	0.107	-0.1	0.179	-0.9	0.363	-0.9
Lab906	Participation cancelled															
Lab908	NA	NA	0.090	-2.3	0.140	-0.7	0.060	-1.1	0.070	-0.3	0.140	1.1	0.220	-0.2	0.400	-0.6
Lab910	0.515	-0.2	0.161	-0.9	0.170	0.0	0.088	0.2	0.080	0.2	0.119	0.3	0.251	0.4	0.521	0.4
Lab912	NA	NA	NA	NA	NA	NA	0.094	0.5	0.070	-0.3	NA	NA	0.220	-0.2	NA	NA
Lab914	0.500	-0.3	0.258	0.9	0.201	0.7	0.068	-0.7	0.064	-0.6	0.115	0.2	0.207	-0.4	0.428	-0.3
Lab916	0.485	-0.4	0.201	-0.2	0.158	-0.3	0.083	0.0	0.062	-0.7	0.077	-1.2	0.180	-0.9	0.381	-0.7
Lab918	0.409	-0.9	0.202	-0.1	0.246	1.8	0.091	0.4	0.089	0.7	0.121	0.4	0.268	0.7	0.422	-0.4
Lab920	0.516	-0.1	0.253	0.8	0.181	0.2	0.074	-0.4	0.073	-0.2	0.095	-0.5	0.195	-0.6	0.439	-0.3
Lab922	0.560	0.2	0.230	0.4	0.190	0.5	0.087	0.2	0.083	0.4	0.100	-0.4	0.190	-0.7	0.480	0.1
Lab924	0.572	0.3	0.185	-0.5	0.177	0.2	0.088	0.2	0.081	0.3	0.119	0.3	0.247	0.3	0.443	-0.2
Lab926	0.565	0.2	NA	NA	0.195	0.6	0.091	0.4	0.088	0.6	0.102	-0.3	0.283	0.9	NA	NA
Lab928	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.216	-0.2	NA	NA
Lab930	NA	NA	ND	-3.8	0.152	-0.4	0.085	0.1	0.071	-0.3	NA	NA	NA	NA	0.353	-1.0
Lab932	NA	NA	NA	NA	0.203	0.8	NA	NA	0.060	-0.9	0.081	-1.1	0.206	-0.4	0.421	-0.4
Lab1116	ND	-3.9	ND	-3.8	ND	-3.8	0.110	1.3	ND	-3.5	ND	-3.6	0.220	-0.2	0.720	2.1

NA: Not analysed ND: Not detected (False negative)

Results reported by the laboratories for the voluntary pesticides penthiopyrad, spinetoram and tritosulfuron (mg/kg) and their calculated z score value using FFP-RSD 25 %.

Lab Code	Penthiopyrad	z score (FFP-RSD 25 %)	Spinetoram	z score (FFP-RSD 25 %)	Tritosulfuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.223**		**0.056**		**0.066**	
Lab522	NA	NA	NA	NA	NA	NA
Lab524	NA	NA	NA	NA	NA	NA
Lab528	0.264	0.7	0.059	0.2	0.080	0.8
Lab530	NA	NA	NA	NA	NA	NA
Lab532	0.194	-0.5	0.057	0.1	ND	-3.4
Lab534	0.235	0.2	0.047	-0.6	NA	NA
Lab536	NA	NA	NA	NA	NA	NA
Lab538	NA	NA	NA	NA	NA	NA
Lab540	0.258	0.6	NA	NA	0.065	-0.1
Lab544	0.202	-0.4	0.053	-0.2	NA	NA
Lab546	0.199	-0.4	0.054	-0.1	0.084	1.1
Lab548	0.197	-0.5	0.044	-0.8	0.040	-1.6
Lab550	NA	NA	NA	NA	NA	NA
Lab552	NA	NA	NA	NA	NA	NA
Lab554	NA	NA	NA	NA	NA	NA
Lab556	0.224	0.0	0.053	-0.2	0.062	-0.3
Lab558	ND	-3.8	ND	-3.3	ND	-3.4
Lab560	0.218	-0.1	0.061	0.4	0.072	0.3
Lab562	0.210	-0.2	0.081	1.8	NA	NA
Lab564	0.227	0.1	0.052	-0.3	0.060	-0.4
Lab566	0.232	0.2	0.068	0.9	NA	NA
Lab568	0.269	0.8	0.063	0.5	NA	NA
Lab570	NA	NA	0.091	2.5	NA	NA
Lab572	NA	NA	NA	NA	0.087	1.2
Lab574	0.230	0.1	NA	NA	NA	NA
Lab576	NA	NA	ND	-3.3	NA	NA
Lab580	0.237	0.2	NA	NA	NA	NA
Lab582	0.226	0.0	ND	-3.3	NA	NA
Lab584	0.160	-1.1	0.031	-1.8	0.046	-1.2
Lab586	0.260	0.7	0.046	-0.7	0.062	-0.3
Lab588	NA	NA	NA	NA	NA	NA
Lab590	0.242	0.3	0.062	0.5	NA	NA

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Penthiopyrad	z score (FFP-RSD 25 %)	Spinetoram	z score (FFP-RSD 25 %)	Trifosulfuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.223**		**0.056**		**0.066**	
Lab592	NA	NA	NA	NA	NA	NA
Lab594	0.186	-0.7	0.041	-1.1	ND	-3.4
Lab596	0.178	-0.8	0.053	-0.2	NA	NA
Lab598	0.209	-0.3	0.047	-0.7	NA	NA
Lab600	NA	NA	NA	NA	NA	NA
Lab602	0.150	-1.3	0.042	-1.0	NA	NA
Lab604	NA	NA	NA	NA	NA	NA
Lab606	0.270	0.8	NA	NA	NA	NA
Lab608	NA	NA	NA	NA	NA	NA
Lab610	0.168	-1.0	0.050	-0.4	NA	NA
Lab612	NA	NA	NA	NA	NA	NA
Lab614	NA	NA	ND	-3.6	NA	NA
Lab616	NA	NA	NA	NA	NA	NA
Lab618	0.205	-0.3	0.053	-0.2	NA	NA
Lab620	0.149	-1.3	0.032	-1.7	NA	NA
Lab622	0.193	-0.5	0.054	-0.1	0.063	-0.2
Lab624	0.225	0.0	0.059	0.2	0.066	0.0
Lab626	0.236	0.2	0.095	2.8	NA	NA
Lab628	NA	NA	NA	NA	NA	NA
Lab632	0.247	0.4	0.053	-0.2	NA	NA
Lab634	NA	NA	0.058	0.2	0.066	0.0
Lab636	0.247	0.4	0.036	-1.4	NA	NA
Lab638	NA	NA	NA	NA	NA	NA
Lab640	0.210	-0.2	0.055	-0.1	NA	NA
Lab642	0.216	-0.1	0.053	-0.2	0.054	-0.8
Lab644	NA	NA	NA	NA	NA	NA
Lab646	0.224	0.0	0.058	0.2	0.057	-0.5
Lab648	NA	NA	NA	NA	NA	NA
Lab650	NA	NA	NA	NA	NA	NA
Lab654	0.209	-0.3	0.067	0.8	NA	NA
Lab656	NA	NA	0.049	-0.5	NA	NA
Lab658	NA	NA	NA	NA	NA	NA
Lab660	NA	NA	NA	NA	NA	NA

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Penthiopyrad	z score (FFP-RSD 25 %)	Spinetoram	z score (FFP-RSD 25 %)	Trifosulfuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.223**		**0.056**		**0.066**	
Lab662	NA	NA	NA	NA	NA	NA
Lab664	NA	NA	NA	NA	NA	NA
Lab666	0.230	0.1	0.094	2.7	ND	-3.4
Lab668	NA	NA	NA	NA	NA	NA
Lab670	0.210	-0.2	0.052	-0.3	NA	NA
Lab672	0.250	0.5	NA	NA	NA	NA
Lab674	0.250	0.5	0.047	-0.6	0.058	-0.5
Lab676	NA	NA	NA	NA	NA	NA
Lab678	NA	NA	0.065	0.7	ND	-3.4
Lab680	0.237	0.2	0.050	-0.4	0.065	-0.1
Lab682	0.211	-0.2	0.070	1.0	NA	NA
Lab684	NA	NA	NA	NA	NA	NA
Lab686	0.246	0.4	0.056	0.0	0.061	-0.3
Lab688	NA	NA	NA	NA	NA	NA
Lab690	0.239	0.3	0.067	0.8	NA	NA
Lab692	NA	NA	0.052	-0.3	NA	NA
Lab694	NA	NA	NA	NA	NA	NA
Lab696	NA	NA	NA	NA	NA	NA
Lab698	NA	NA	NA	NA	NA	NA
Lab700	0.235	0.2	0.058	0.2	NA	NA
Lab702	0.249	0.5	0.060	0.3	NA	NA
Lab704	NA	NA	0.053	-0.2	NA	NA
Lab706	0.221	0.0	0.055	-0.1	NA	NA
Lab708	0.239	0.3	0.081	1.8	0.081	0.9
Lab710	0.184	-0.7	0.042	-1.0	NA	NA
Lab712	0.242	0.3	0.046	-0.7	NA	NA
Lab714	NA	NA	NA	NA	NA	NA
Lab716	NA	NA	0.034	-1.6	NA	NA
Lab718	0.214	-0.2	NA	NA	0.071	0.3
Lab720	0.260	0.7	0.086	2.2	0.060	-0.4
Lab722	0.253	0.5	NA	NA	NA	NA
Lab724	NA	NA	NA	NA	NA	NA
Lab726	0.258	0.6	NA	NA	NA	NA

APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Penthiopyrad	z score (FFP-RSD 25 %)	Spinetoram	z score (FFP-RSD 25 %)	Trifosulfuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.223**		**0.056**		**0.066**	
Lab728	0.266	0.8	0.083	2.0	0.071	0.3
Lab730	0.226	0.0	0.075	1.4	ND	-3.4
Lab732	NA	NA	NA	NA	NA	NA
Lab734	0.209	-0.3	0.050	-0.4	ND	-3.4
Lab736	NA	NA	NA	NA	NA	NA
Lab738	NA	NA	NA	NA	NA	NA
Lab740	NA	NA	0.070	1.0	NA	NA
Lab742	0.274	0.9	NA	NA	0.050	-1.0
Lab744	0.206	-0.3	0.050	-0.4	0.046	-1.2
Lab746	0.250	0.5	NA	NA	NA	NA
Lab748	NA	NA	NA	NA	NA	NA
Lab750	0.272	0.9	NA	NA	0.069	0.2
Lab752	0.220	-0.1	NA	NA	NA	NA
Lab754	NA	NA	NA	NA	NA	NA
Lab756	ND	-3.8	0.031	-1.8	0.071	0.3
Lab758	ND	-3.8	ND	-3.3	ND	-3.4
Lab760	0.228	0.1	0.034	-1.6	0.062	-0.3
Lab762	NA	NA	NA	NA	NA	NA
Lab764	0.224	0.0	NA	NA	0.075	0.5
Lab766	NA	NA	ND	-3.3	NA	NA
Lab768	0.217	-0.1	0.062	0.4	NA	NA
Lab770	0.243	0.4	0.050	-0.4	NA	NA
Lab772	NA	NA	NA	NA	NA	NA
Lab774	NA	NA	NA	NA	NA	NA
Lab776	NA	NA	NA	NA	NA	NA
Lab778	0.151	-1.3	0.031	-1.8	0.044	-1.4
Lab780	NA	NA	NA	NA	NA	NA
Lab782	NA	NA	NA	NA	NA	NA
Lab784	0.214	-0.2	0.049	-0.5	NA	NA
Lab786	0.191	-0.6	0.046	-0.7	0.069	0.1
Lab788	NA	NA	NA	NA	0.072	0.3
Lab792	0.200	-0.4	0.058	0.2	NA	NA
Lab794	0.230	0.1	0.048	-0.6	NA	NA

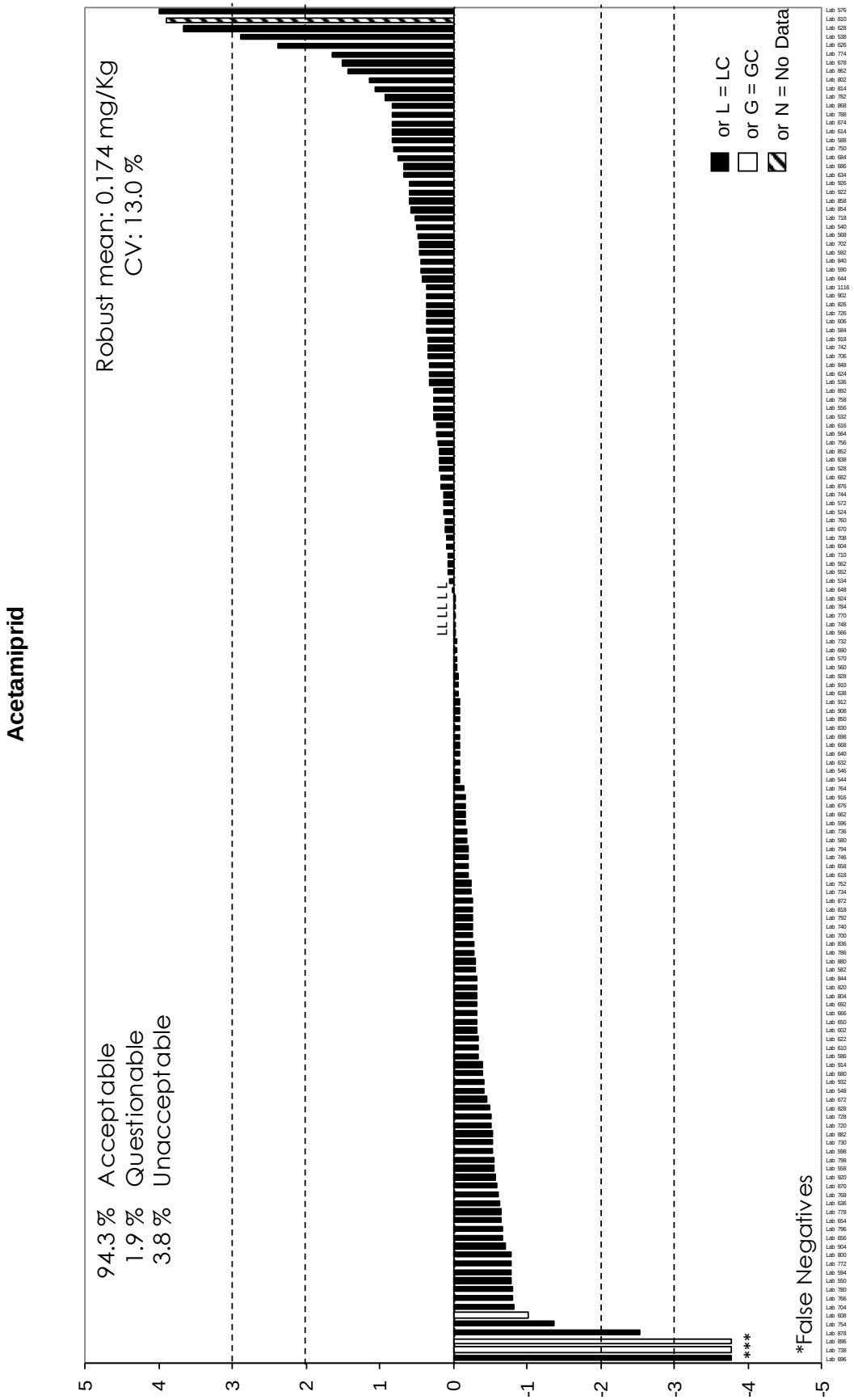
APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Penthiopyrad	z score (FFP-RSD 25 %)	Spinetoram	z score (FFP-RSD 25 %)	Trifosulfuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.223**		**0.056**		**0.066**	
Lab796	0.220	-0.1	0.041	-1.1	0.055	-0.7
Lab798	NA	NA	NA	NA	NA	NA
Lab800	NA	NA	NA	NA	ND	-3.4
Lab802	ND	-3.8	0.056	0.0	0.089	1.4
Lab804	0.230	0.1	0.052	-0.3	0.060	-0.4
Lab810	0.451	4.1	0.036	-1.4	ND	-3.4
Lab814	NA	NA	NA	NA	NA	NA
Lab816	0.257	0.6	NA	NA	NA	NA
Lab818	0.202	-0.4	0.050	-0.4	NA	NA
Lab820	0.200	-0.4	0.049	-0.5	0.073	0.4
Lab822	NA	NA	NA	NA	NA	NA
Lab824	0.220	-0.1	0.115	4.2	ND	-3.4
Lab826	0.220	-0.1	0.060	0.3	0.024	-2.6
Lab828	NA	NA	NA	NA	NA	NA
Lab830	0.210	-0.2	0.042	-1.0	0.062	-0.3
Lab834	NA	NA	NA	NA	NA	NA
Lab836	0.211	-0.2	0.057	0.1	NA	NA
Lab838	0.182	-0.7	0.055	-0.1	ND	-3.4
Lab840	NA	NA	NA	NA	NA	NA
Lab844	0.230	0.1	0.100	3.2	ND	-3.4
Lab848	NA	NA	NA	NA	NA	NA
Lab850	NA	NA	NA	NA	NA	NA
Lab852	NA	NA	NA	NA	NA	NA
Lab854	NA	NA	NA	NA	NA	NA
Lab856	NA	NA	NA	NA	NA	NA
Lab858	0.169	-1.0	0.109	3.8	0.061	-0.3
Lab862	NA	NA	0.061	0.4	NA	NA
Lab866	NA	NA	0.062	0.4	NA	NA
Lab868	0.190	-0.6	NA	NA	0.070	0.2
Lab870	NA	NA	NA	NA	NA	NA
Lab872	NA	NA	0.066	0.7	NA	NA
Lab874	NA	NA	NA	NA	NA	NA
Lab876	0.229	0.1	0.065	0.7	0.079	0.8

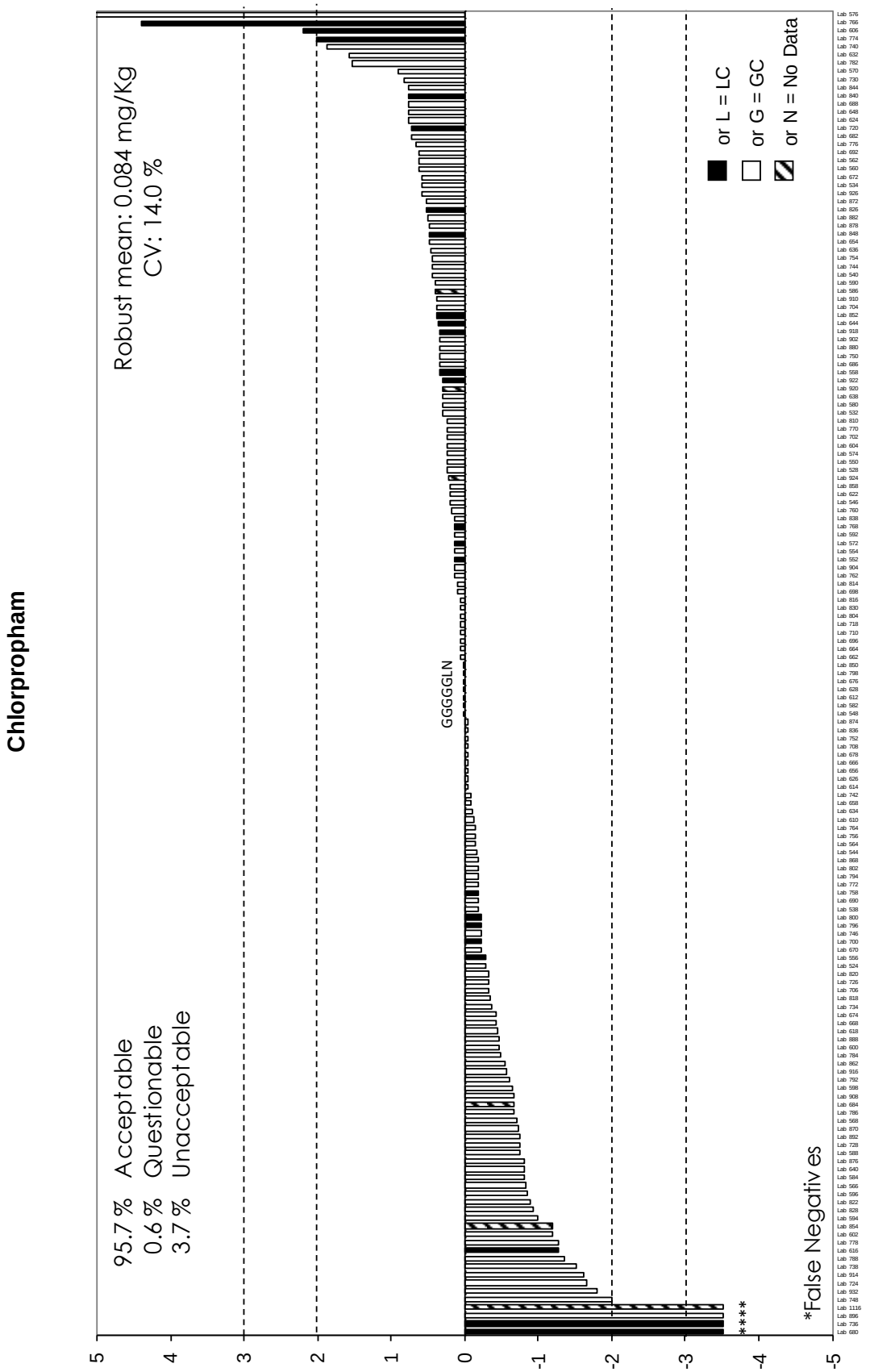
APPENDIX 3. Results (mg/Kg) and z scores for FFP-RSD (25 %).

Lab Code	Penthiopyrad	z score (FFP-RSD 25 %)	Spinetoram	z score (FFP-RSD 25 %)	Trifosulfuron	z score (FFP-RSD 25 %)
MRRL (mg/kg)	**0.010**		**0.010**		**0.010**	
Robust mean (mg/kg)	**0.223**		**0.056**		**0.066**	
Lab878	NA	NA	0.048	-0.6	NA	NA
Lab880	0.240	0.3	0.052	-0.3	0.084	1.1
Lab882	ND	-3.8	NA	NA	NA	NA
Lab884	NA	NA	ND	-3.3	NA	NA
Lab886	NA	NA	NA	NA	NA	NA
Lab888	NA	NA	NA	NA	NA	NA
Lab890	ND	-3.8	ND	-3.3	ND	-3.4
Lab892	ND	-3.8	0.084	2.0	ND	-3.4
Lab896	ND	-3.8	ND	-3.3	ND	-3.4
Lab902	0.208	-0.3	0.056	0.0	0.081	0.9
Lab904	NA	NA	NA	NA	NA	NA
Lab906	Participation cancelled					
Lab908	ND	-3.8	0.040	-1.1	NA	NA
Lab910	NA	NA	NA	NA	NA	NA
Lab912	NA	NA	NA	NA	NA	NA
Lab914	NA	NA	NA	NA	NA	NA
Lab916	0.196	-0.5	NA	NA	NA	NA
Lab918	0.222	0.0	0.054	-0.1	0.070	0.2
Lab920	0.230	0.1	0.056	0.0	NA	NA
Lab922	0.220	-0.1	0.070	1.0	0.071	0.3
Lab924	0.238	0.3	0.055	-0.1	0.084	1.0
Lab926	NA	NA	0.064	0.6	0.075	0.5
Lab928	NA	NA	NA	NA	NA	NA
Lab930	NA	NA	0.047	-0.6	NA	NA
Lab932	NA	NA	NA	NA	NA	NA
Lab1116	ND	-3.8	ND	-3.3	ND	-3.4

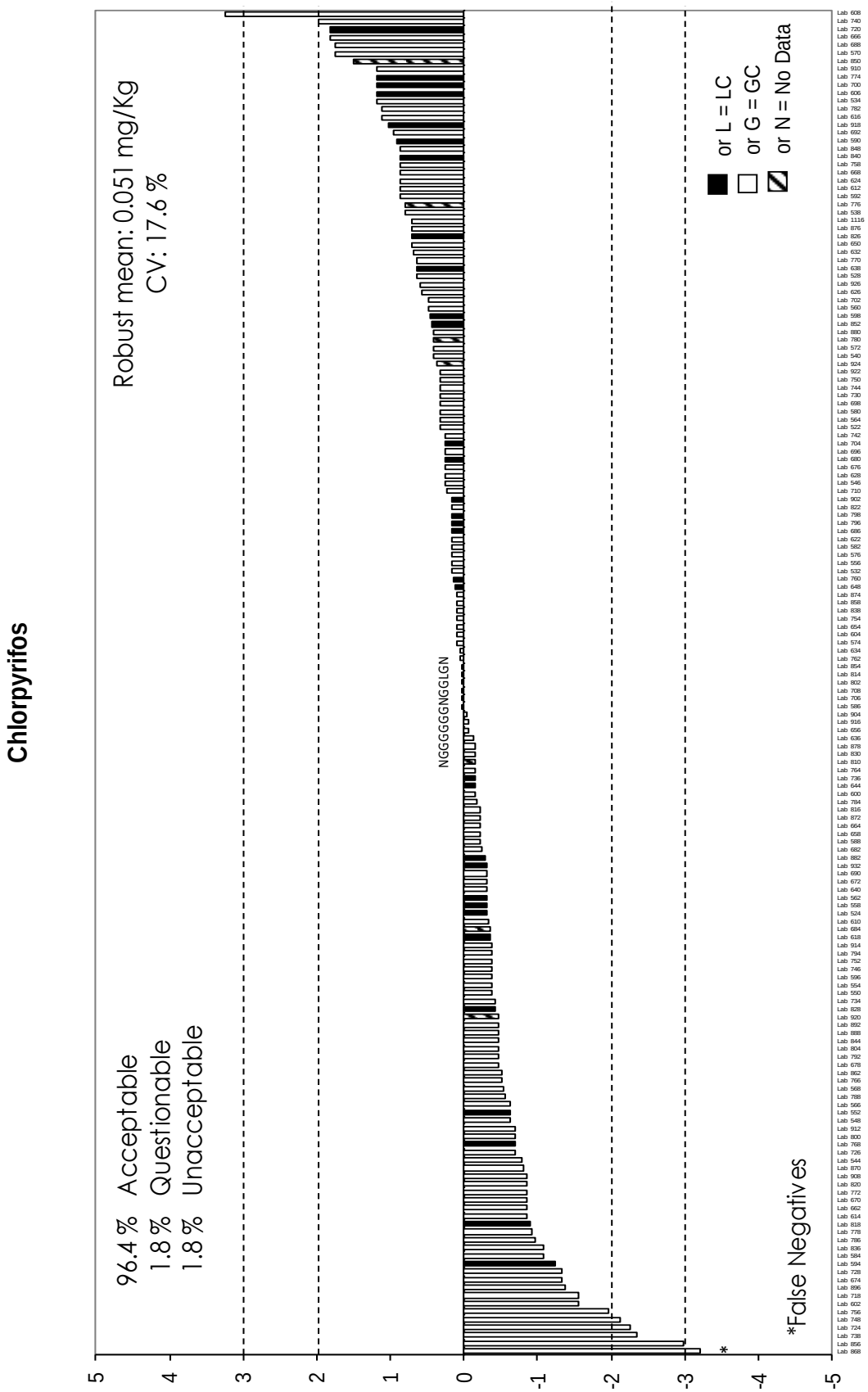
NA: Not analysed ND: Not detected (False negative)


Acetamiprid
Robust mean: 0.174 mg/Kg
CV: 13.0 %
94.3 % Acceptable
1.9 % Questionable
3.8 % Unacceptable
or L = LC
or G = GC
or N = No Data
*False Negatives
***
5
4
3
2
1
0
-1
-2
-3
-4
-5

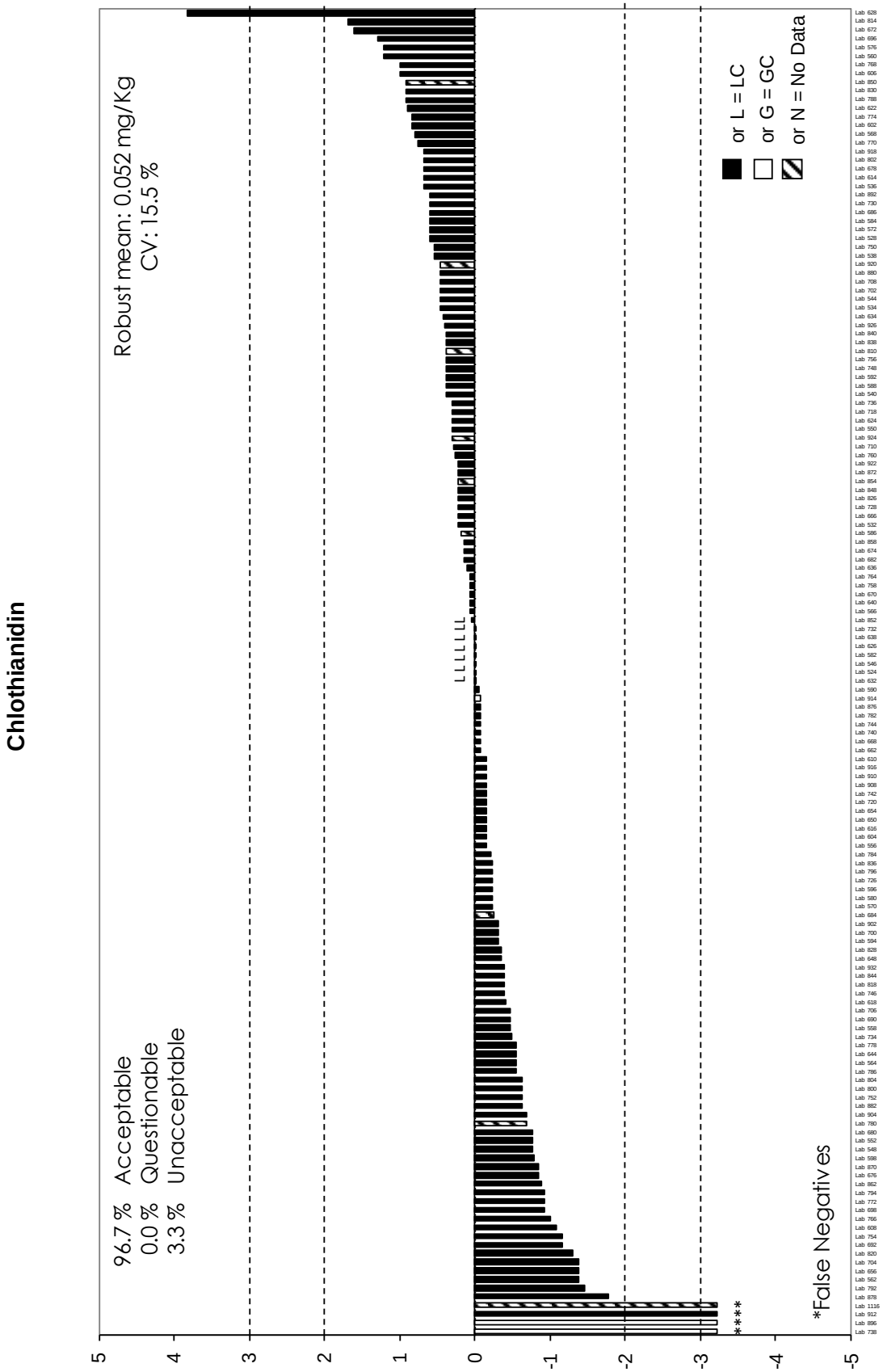
APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).

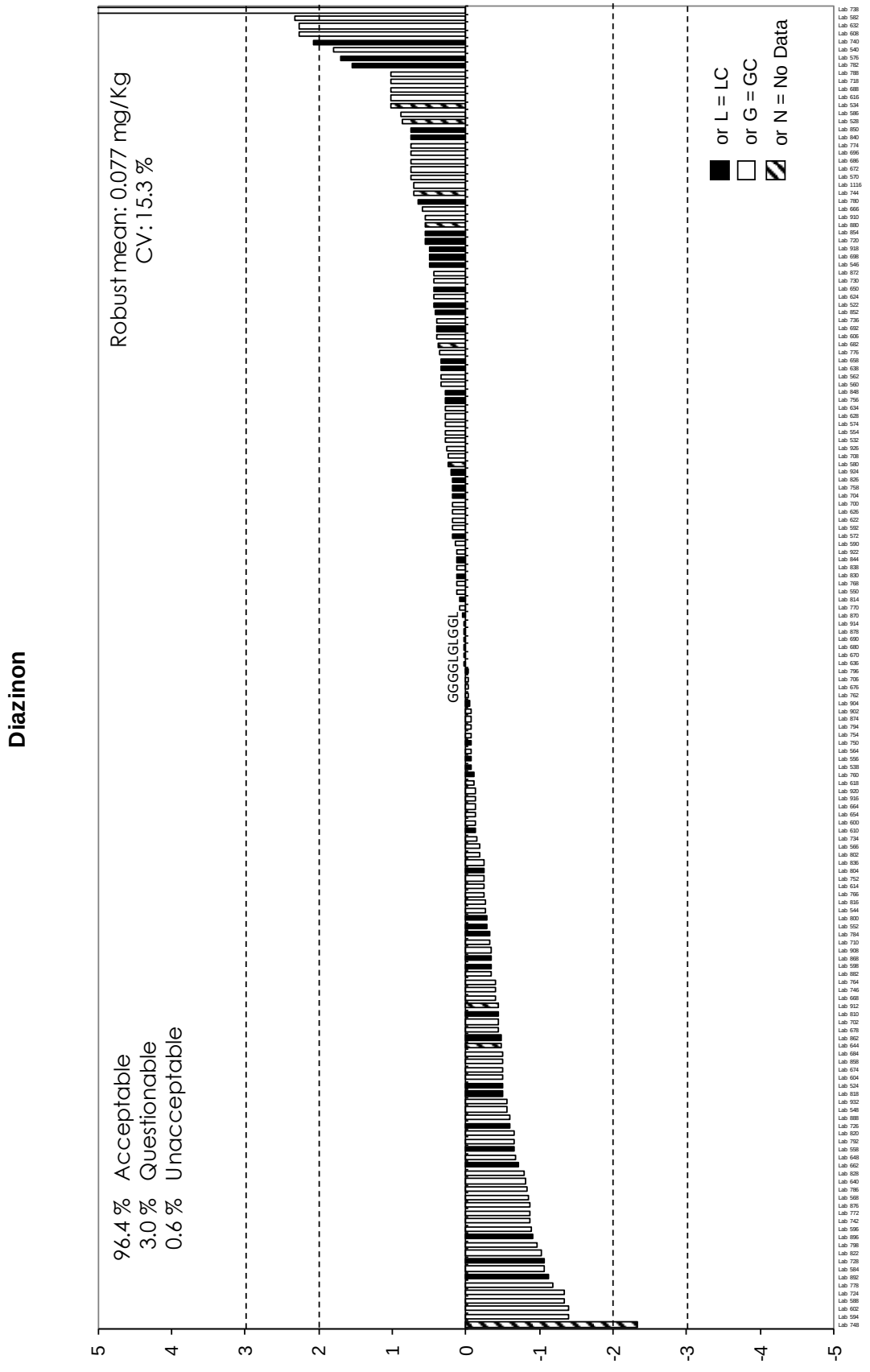


APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).

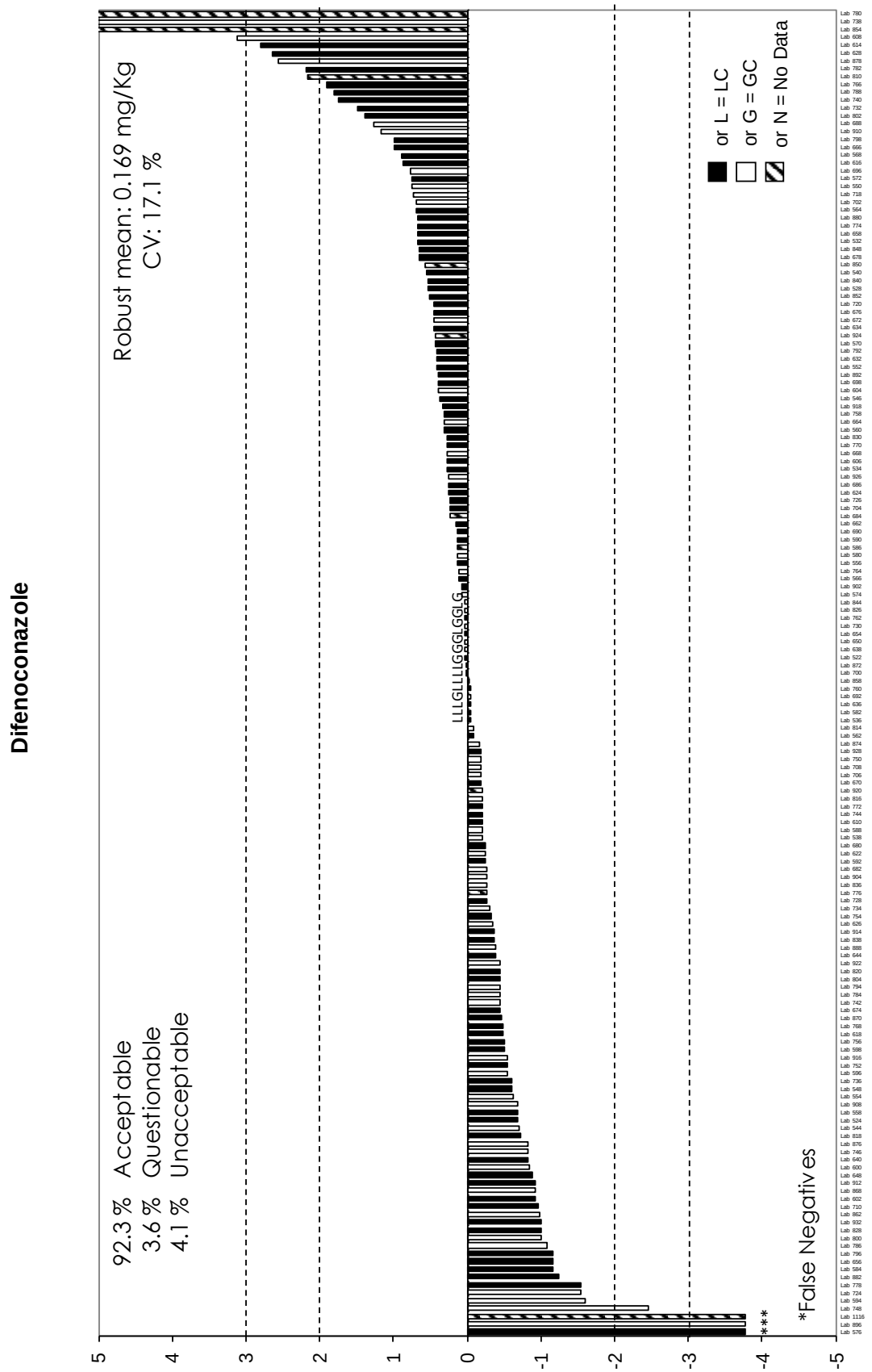


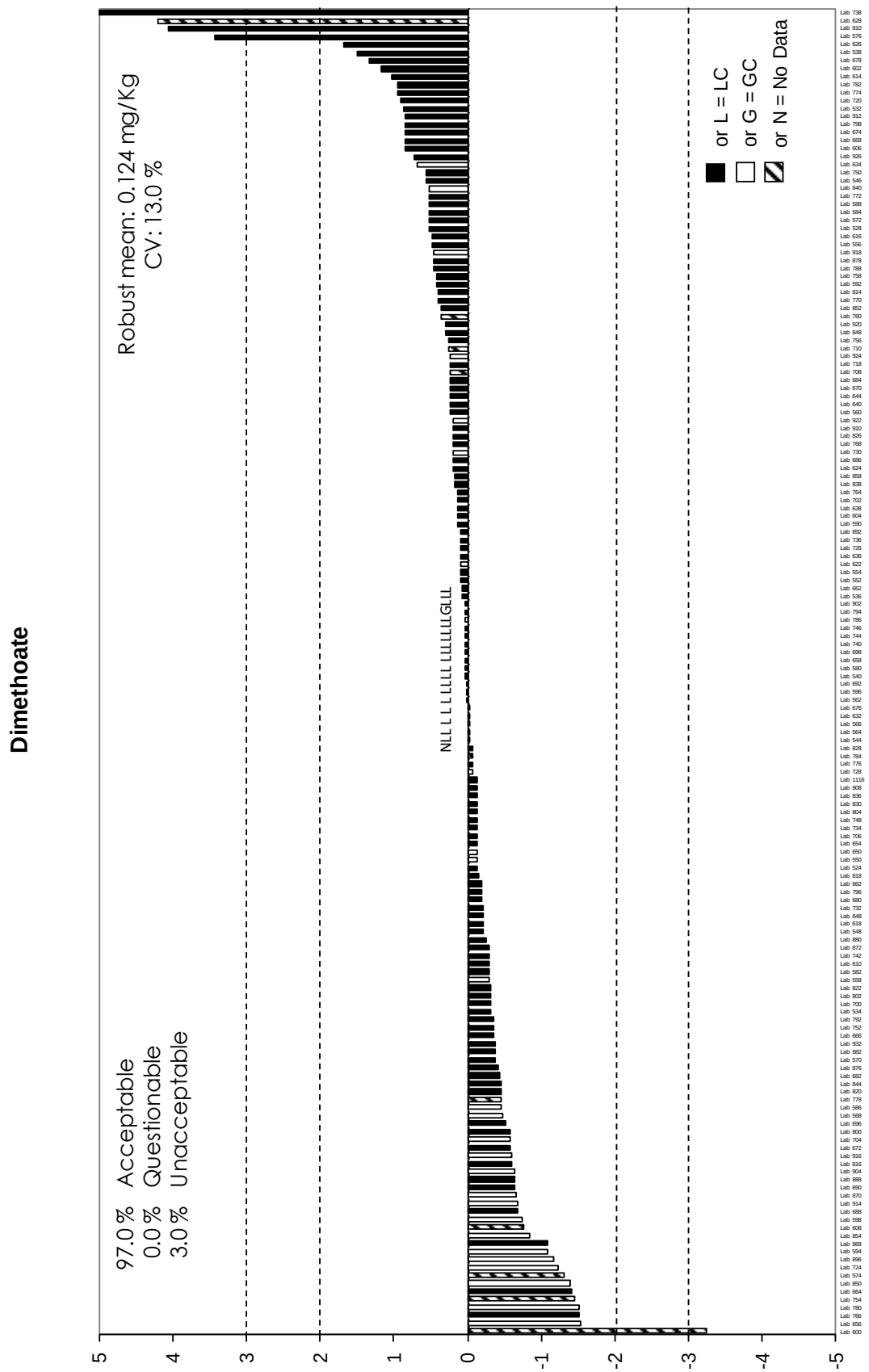
APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).



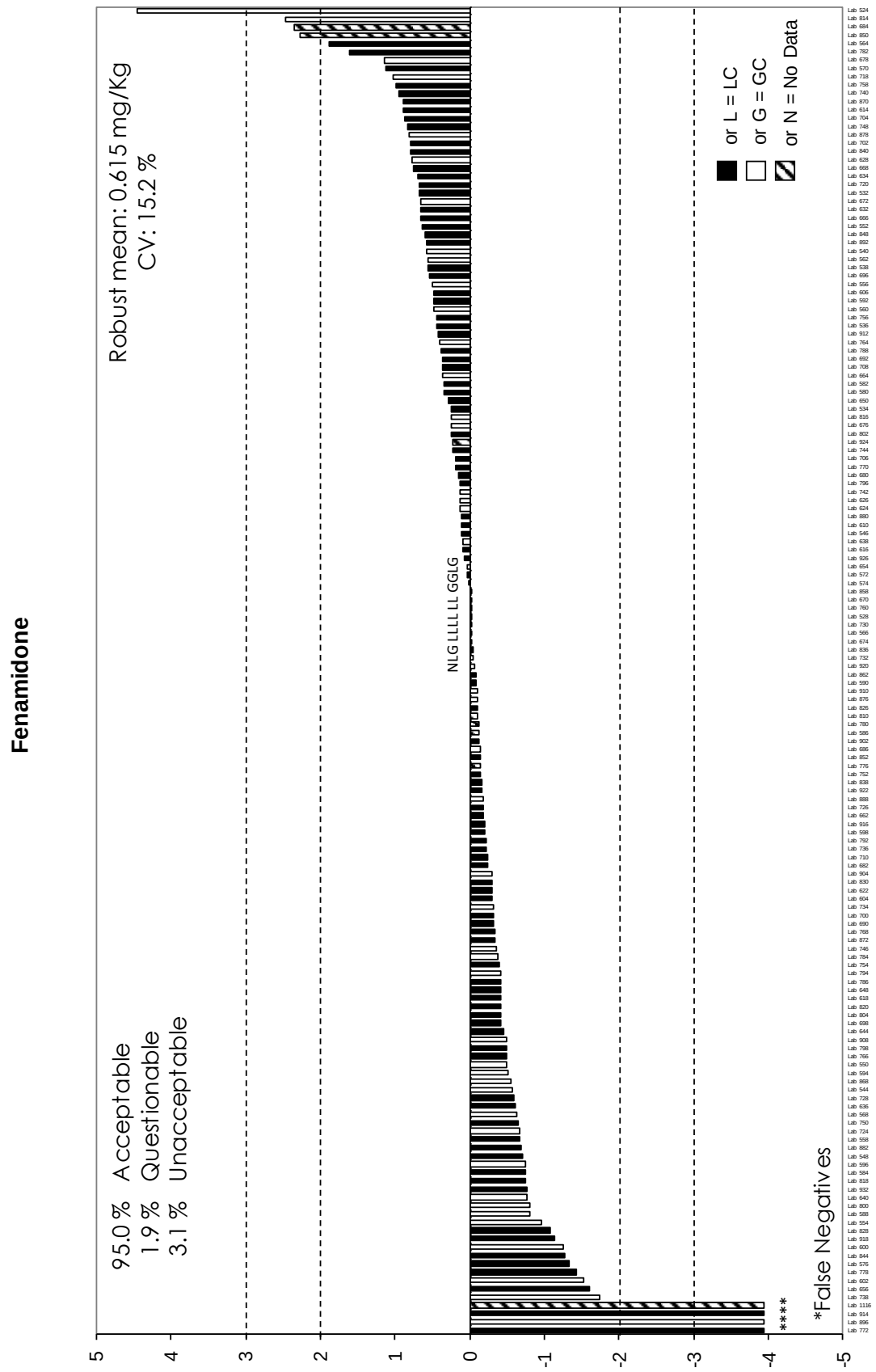

Diazinon
Robust mean: 0.077 mg/Kg
CV: 15.3 %
96.4 % Acceptable
3.0 % Questionable
0.6 % Unacceptable
or L = LC
or G = GC
or N = No Data
5
4
3
2
1
0
-1
-2
-3
-4
-5

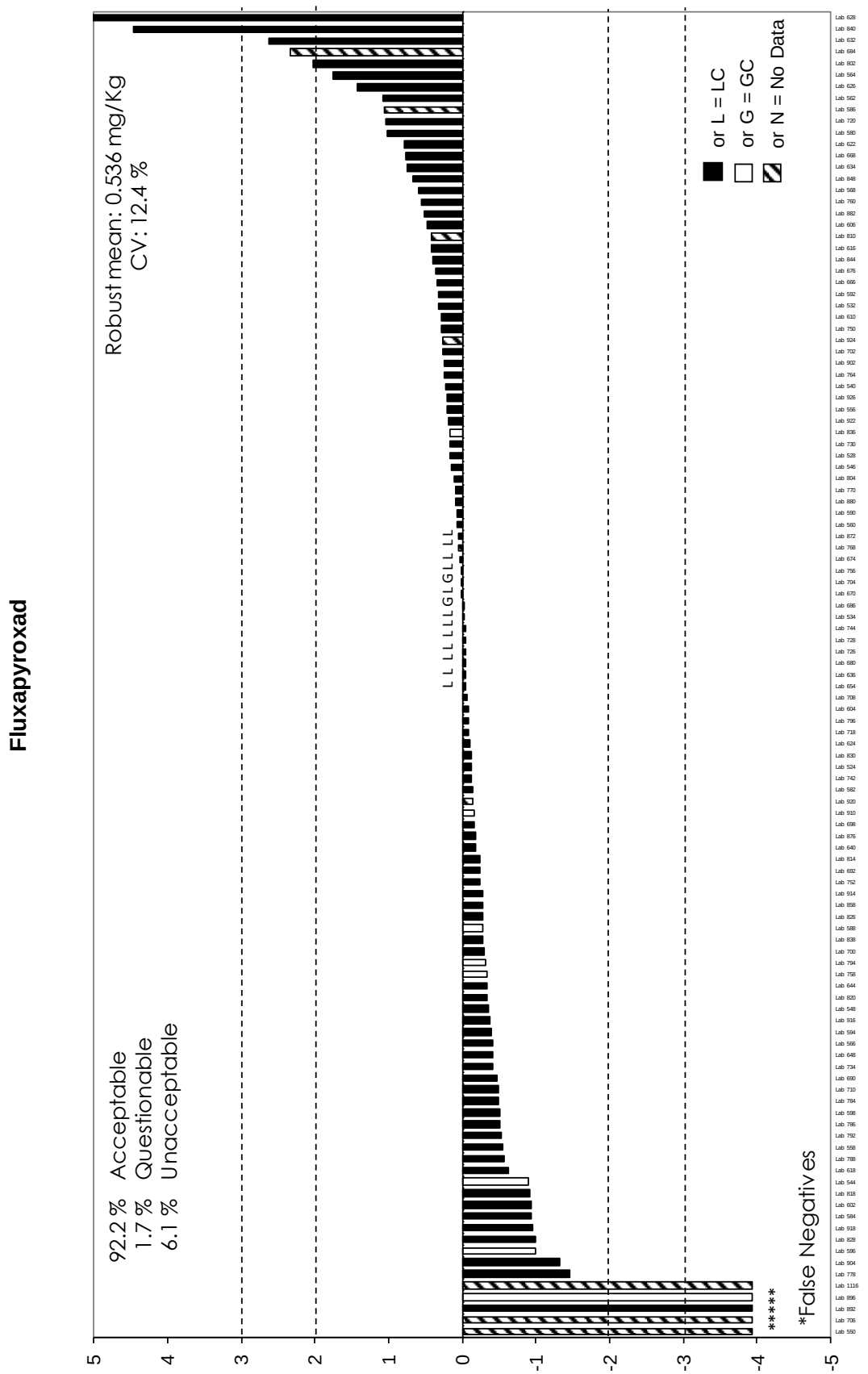
APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).



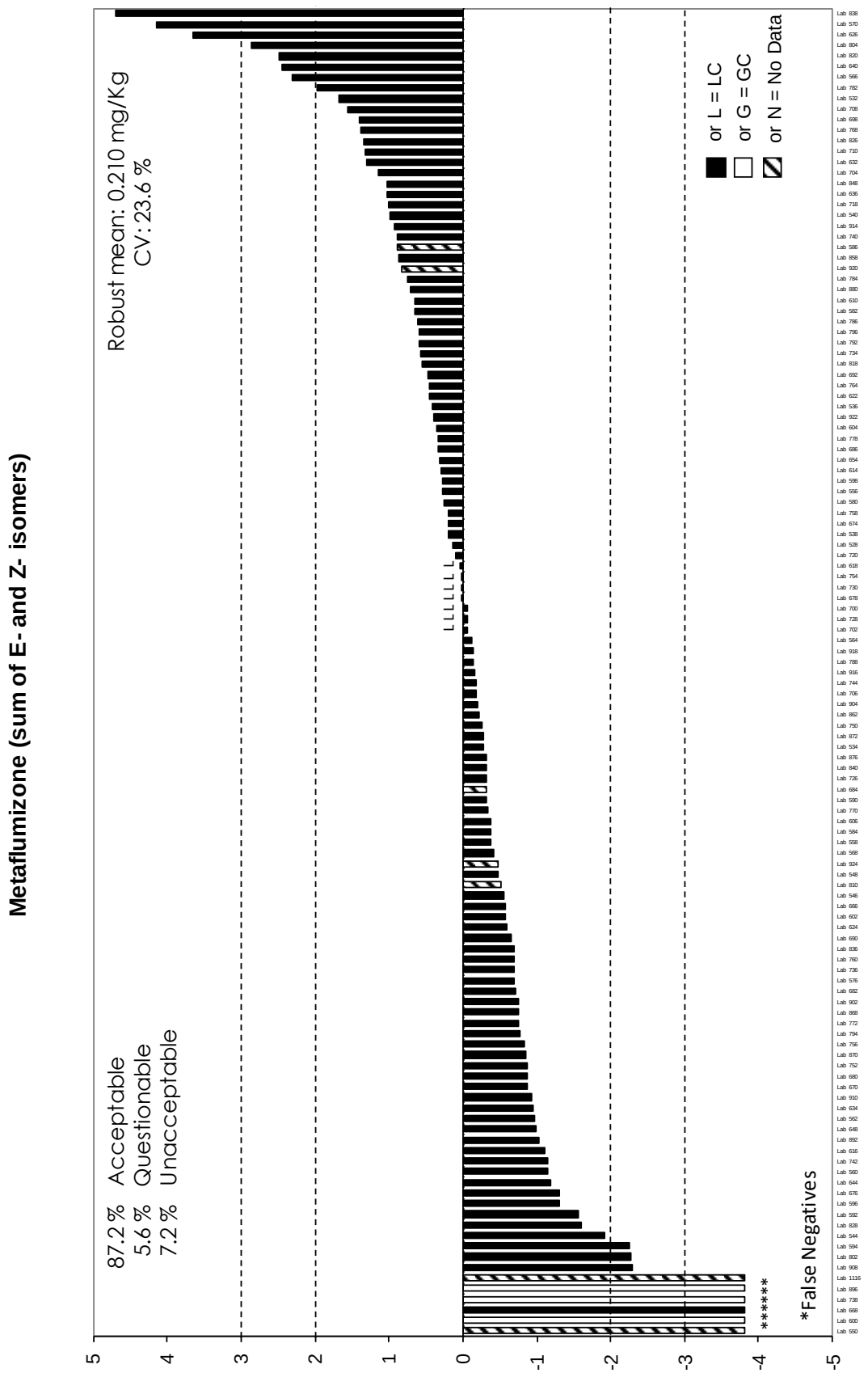

Dimethoate
Robust mean: 0.124 mg/Kg
CV: 13.0 %
97.0 % Acceptable
0.0 % Questionable
3.0 % Unacceptable
or L = LC
or G = GC
or N = No Data
5
4
3
2
1
0
-1
-2
-3
-4
-5

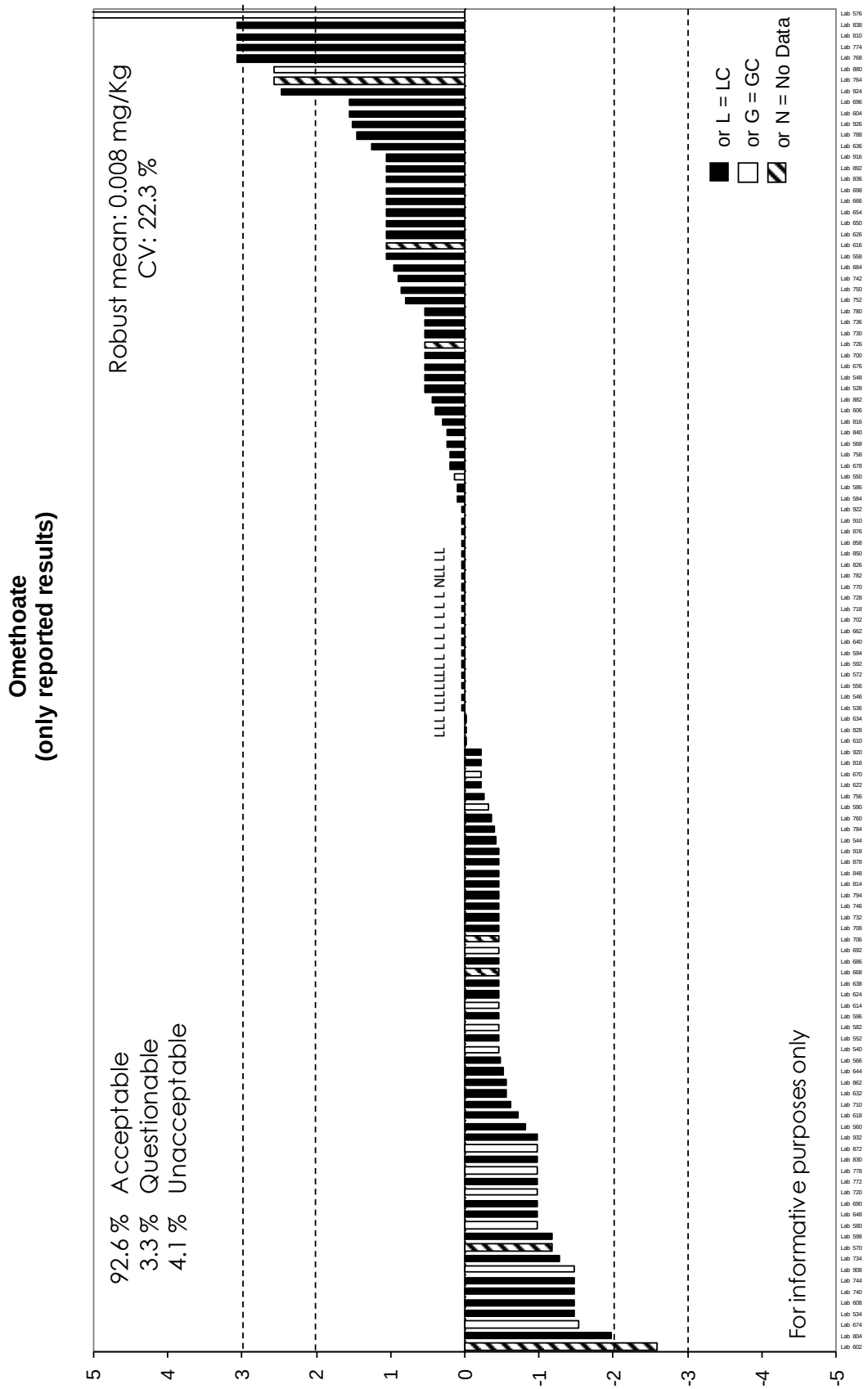
APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).



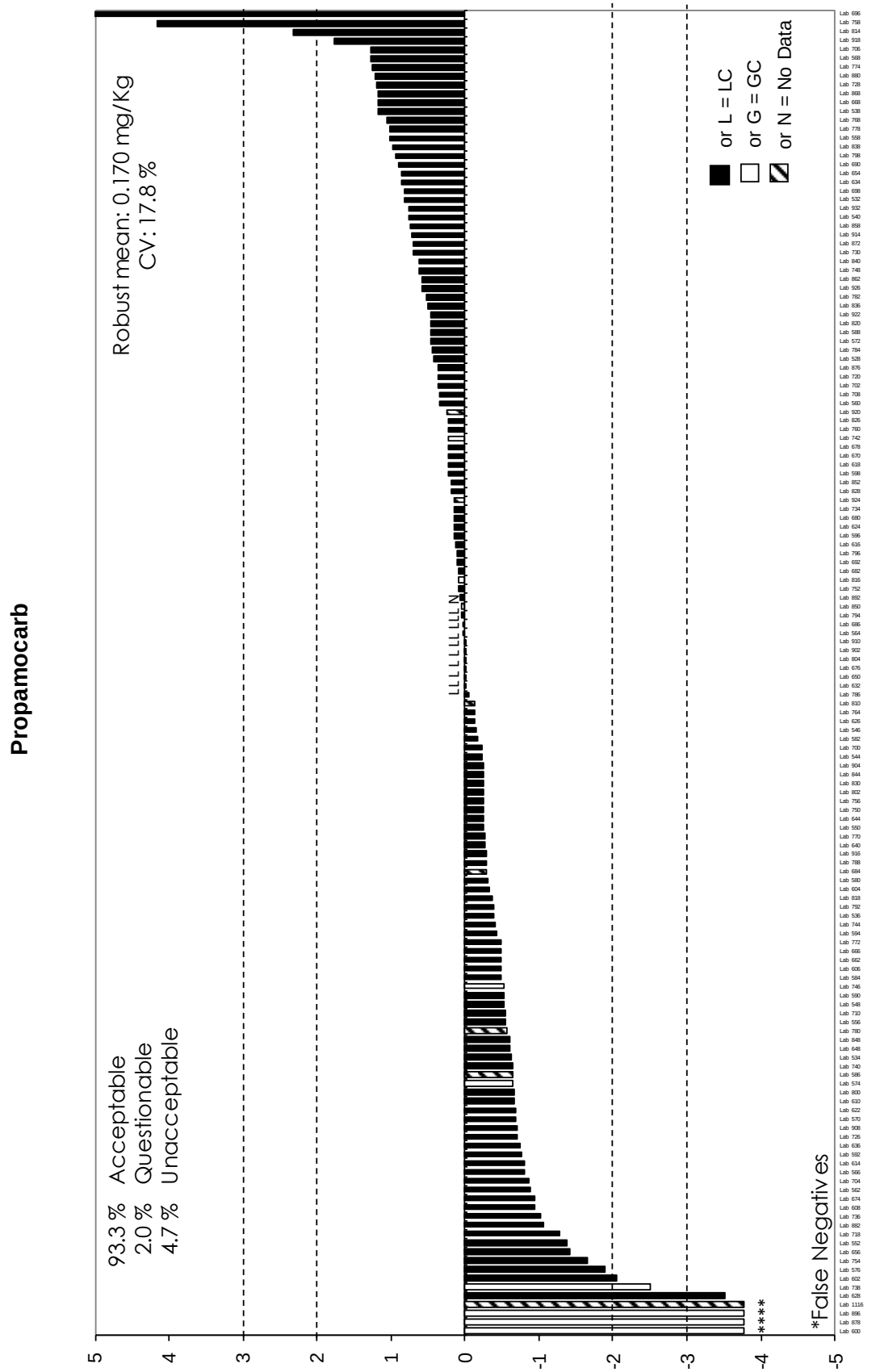

Fluxapyroxad
Robust mean: 0.536 mg/Kg
CV: 12.4 %
92.2 % Acceptable
1.7 % Questionable
6.1 % Unacceptable
L L L L L L L G L G L L L L
*****
*False Negatives
or L = LC
or G = GC
or N = No Data
5
4
3
2
1
0
-1
-2
-3
-4
-5

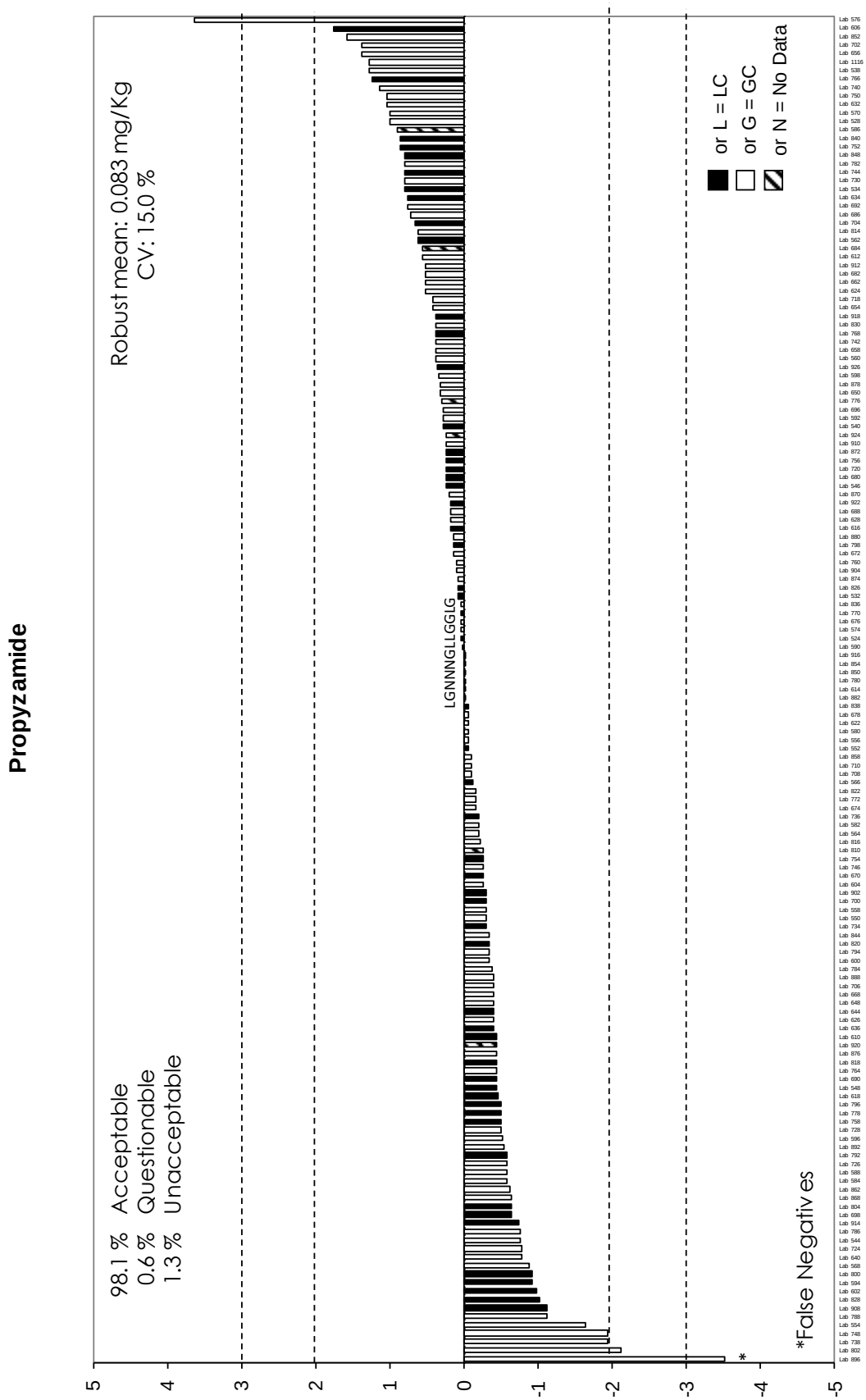
APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).



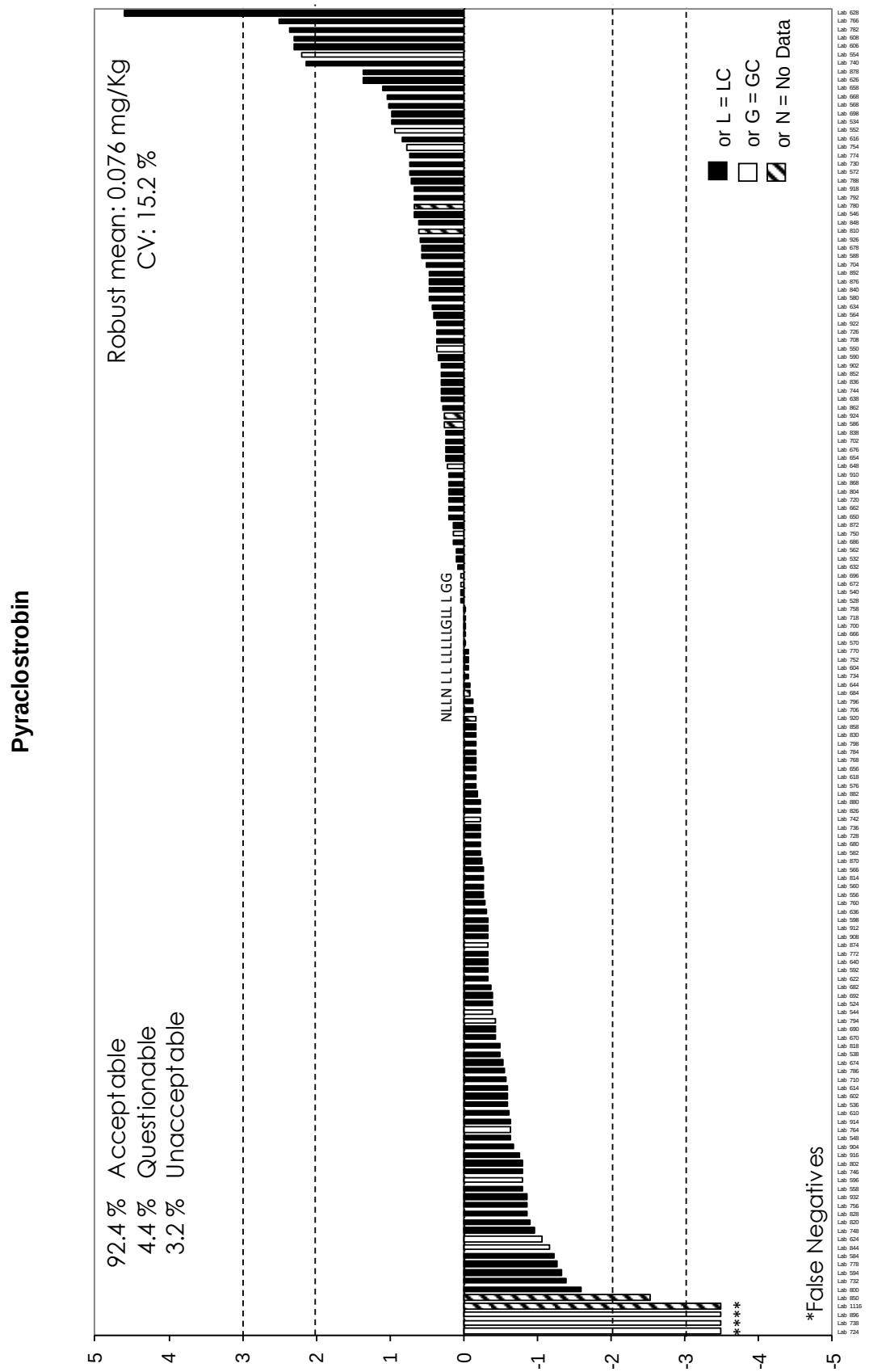

Omethoate
(only reported results)
Robust mean: 0.008 mg/Kg
CV: 22.3 %
92.6 % Acceptable
3.3 % Questionable
4.1 % Unacceptable
or L = LC
or G = GC
or N = No Data
For informative purposes only
LLL LLLLLLLLLLLLLNLLLL
5
4
3
2
1
0
-1
-2
-3
-4
-5

APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).

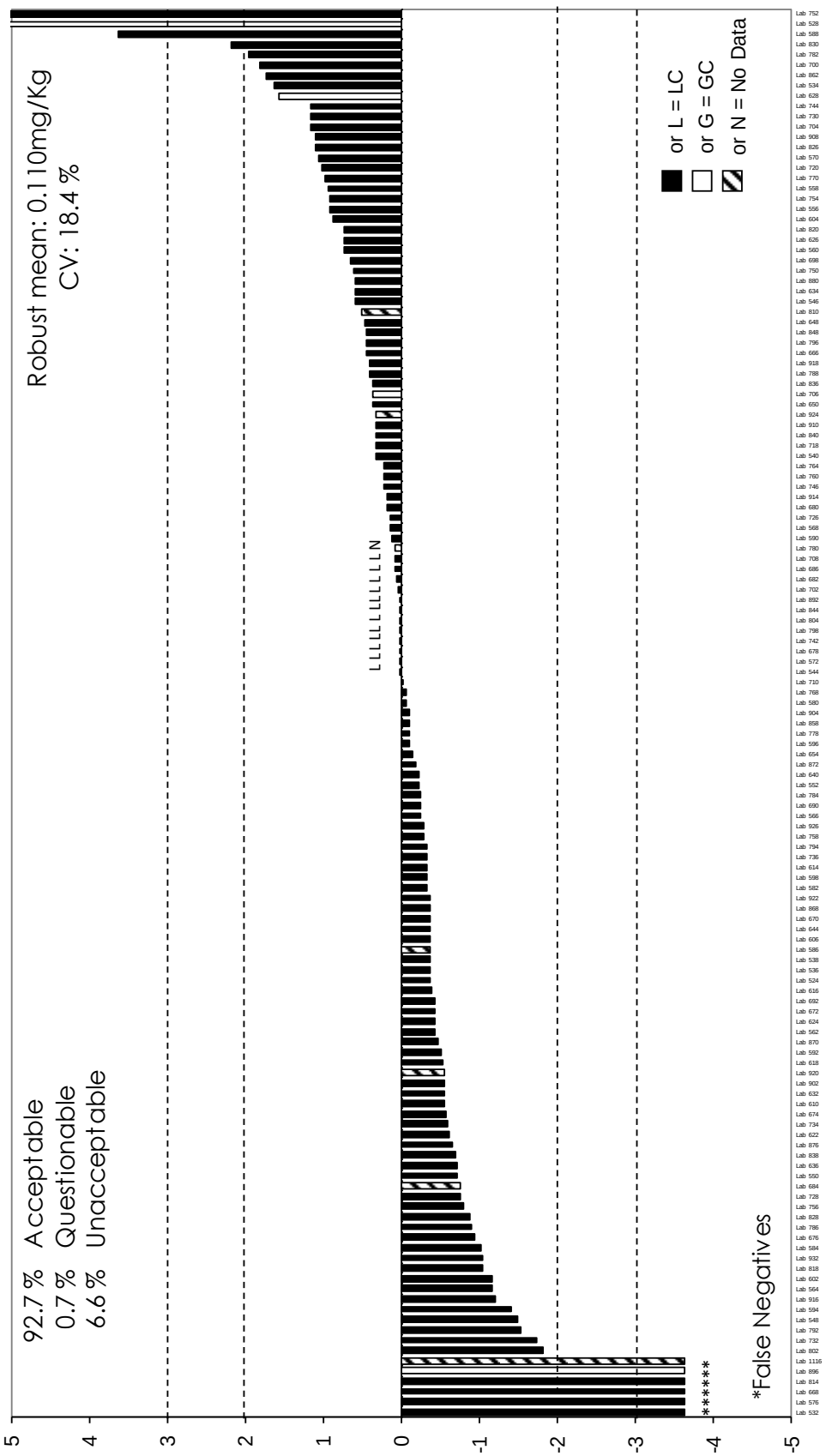



Propyzamide
Robust mean: 0.083 mg/Kg
CV: 15.0 %
98.1 % Acceptable
0.6 % Questionable
1.3 % Unacceptable
LGNNNGLLGGLG
or L = LC
or G = GC
or N = No Data
*False Negatives
5
4
3
2
1
0
-1
-2
-3
-4
-5

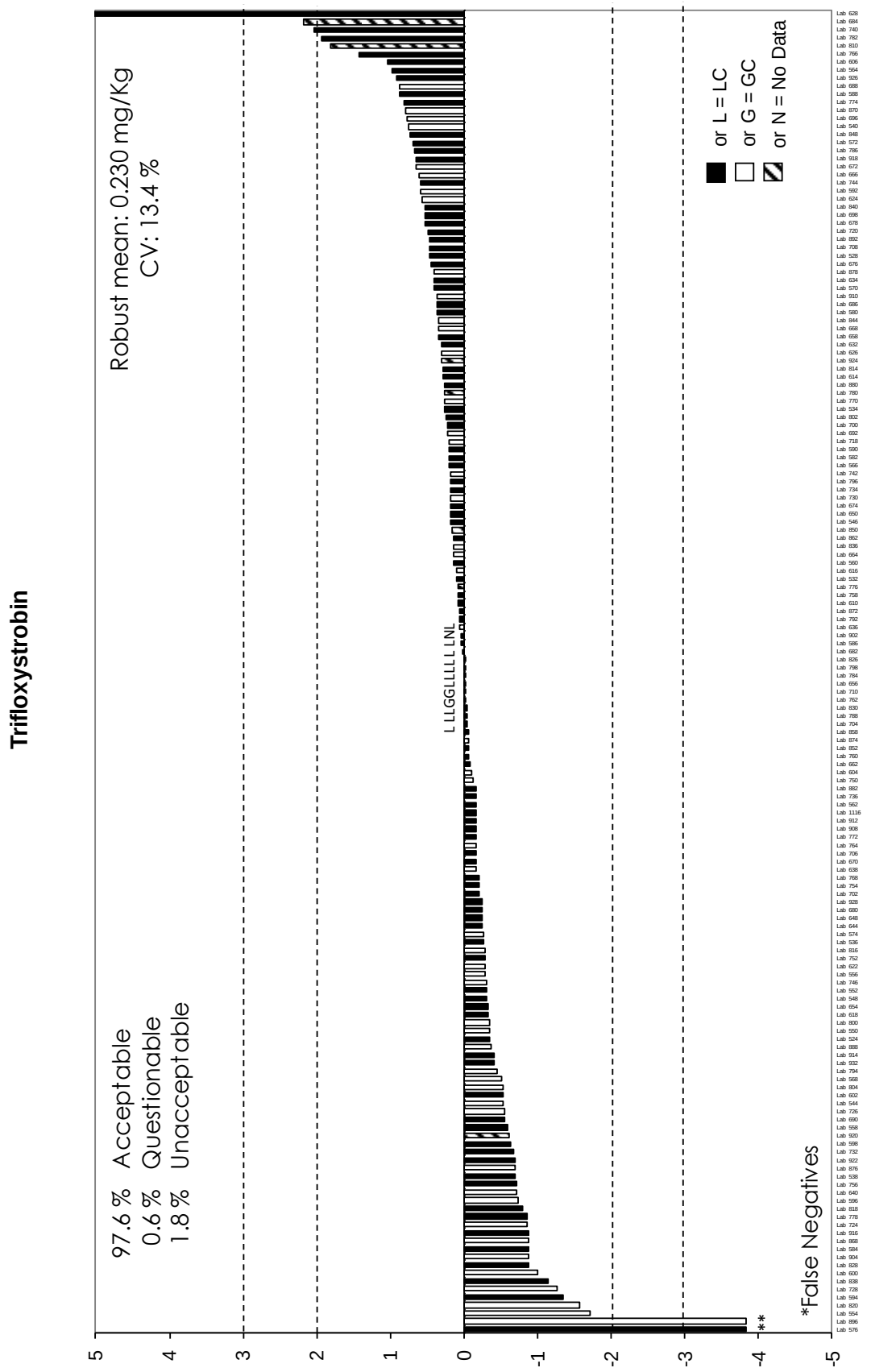
APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).

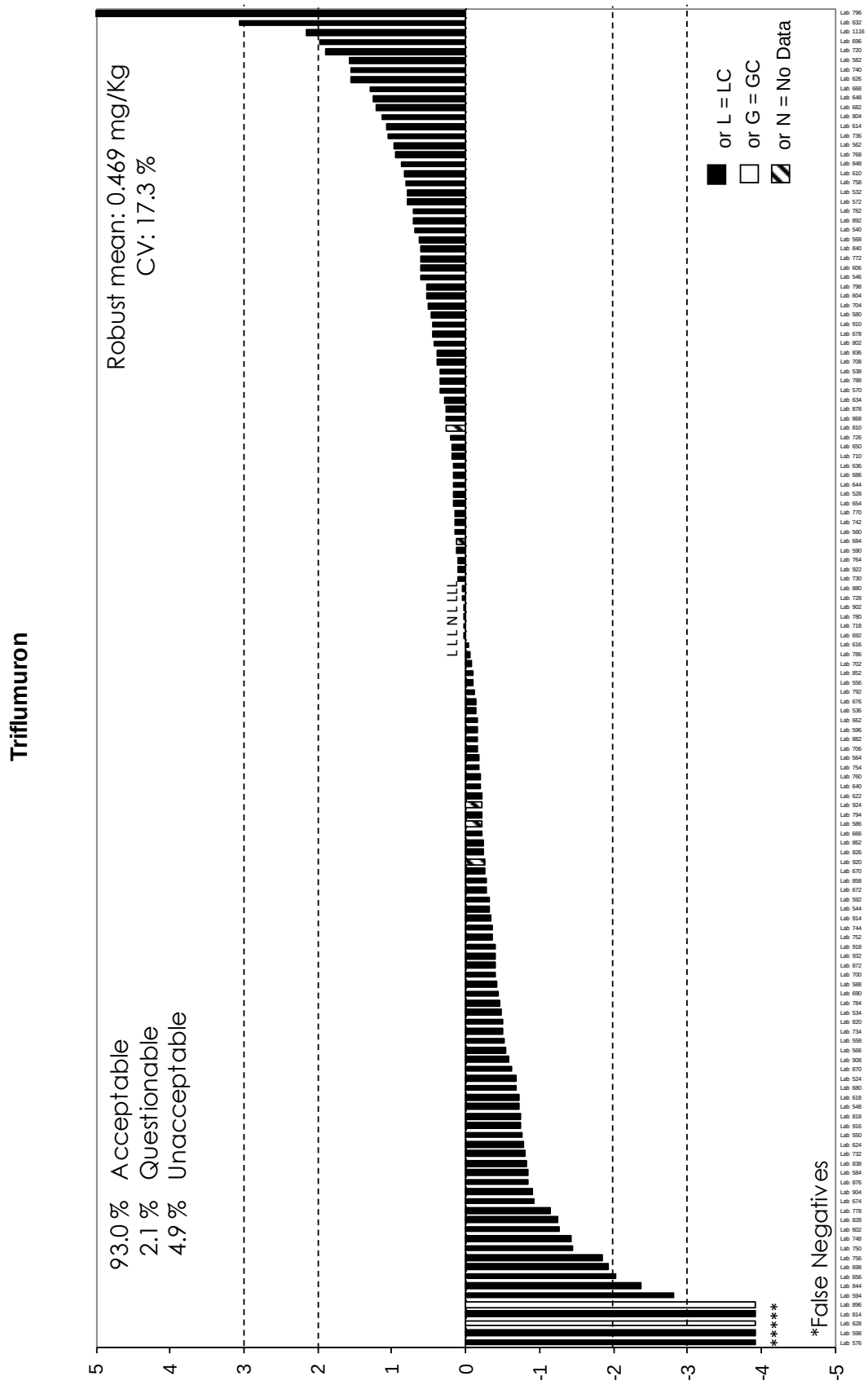


Teflubenzuron

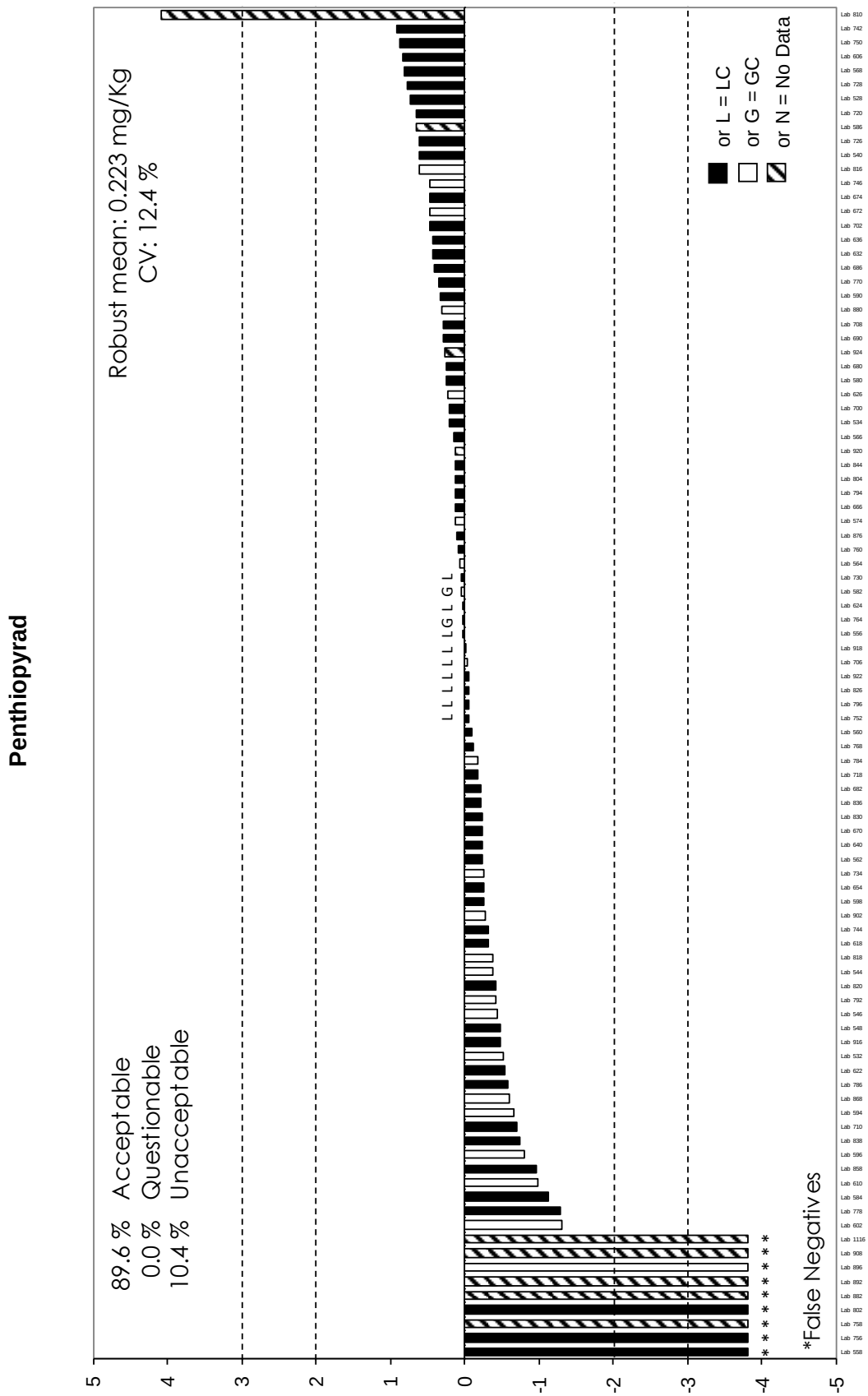


APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).

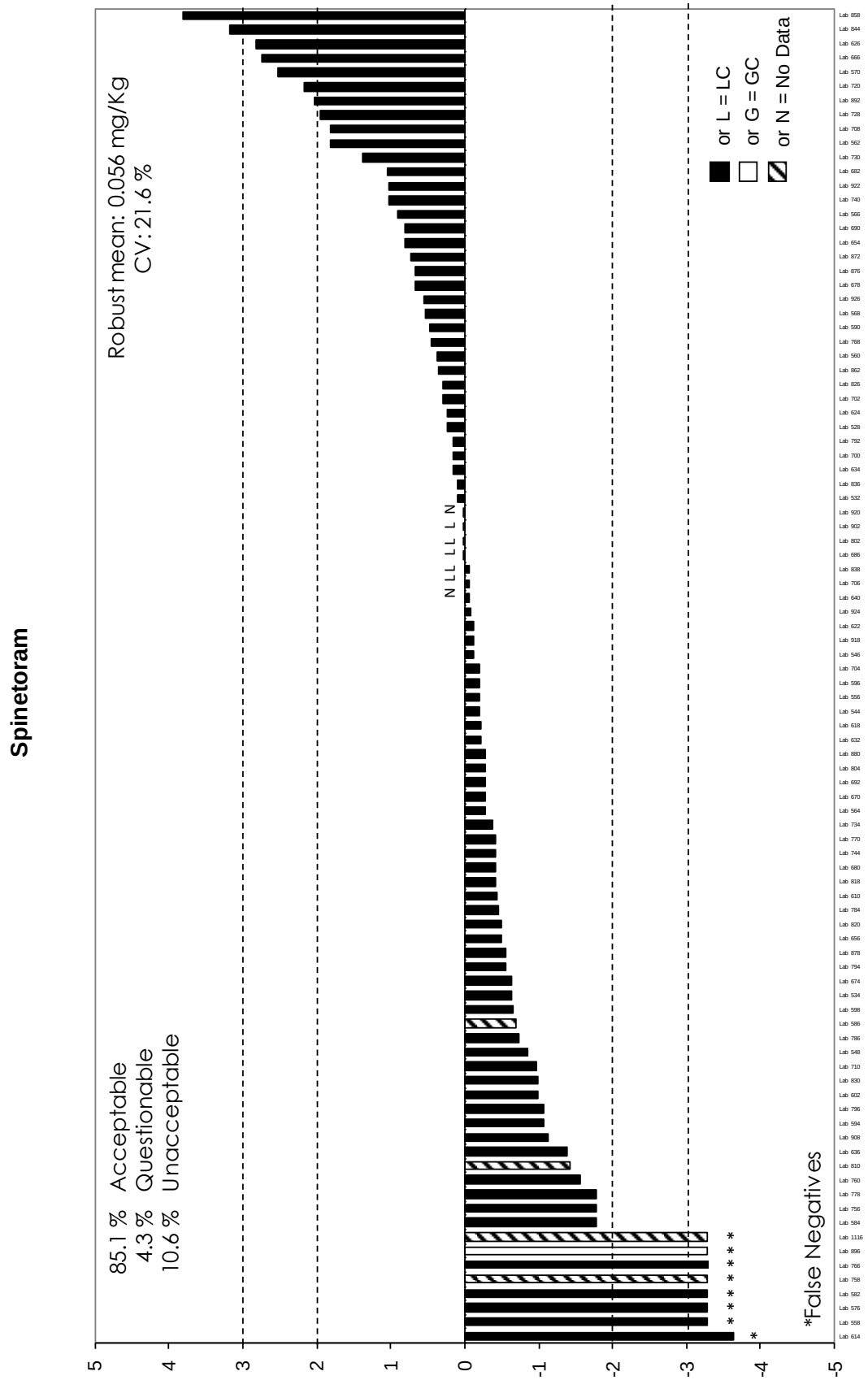



Triflumuron
Robust mean: 0.469 mg/Kg
CV: 17.3 %
93.0 % Acceptable
2.1 % Questionable
4.9 % Unacceptable
or L = LC
or G = GC
or N = No Data
*False Negatives
*****
5
4
3
2
1
0
-1
-2
-3
-4
-5

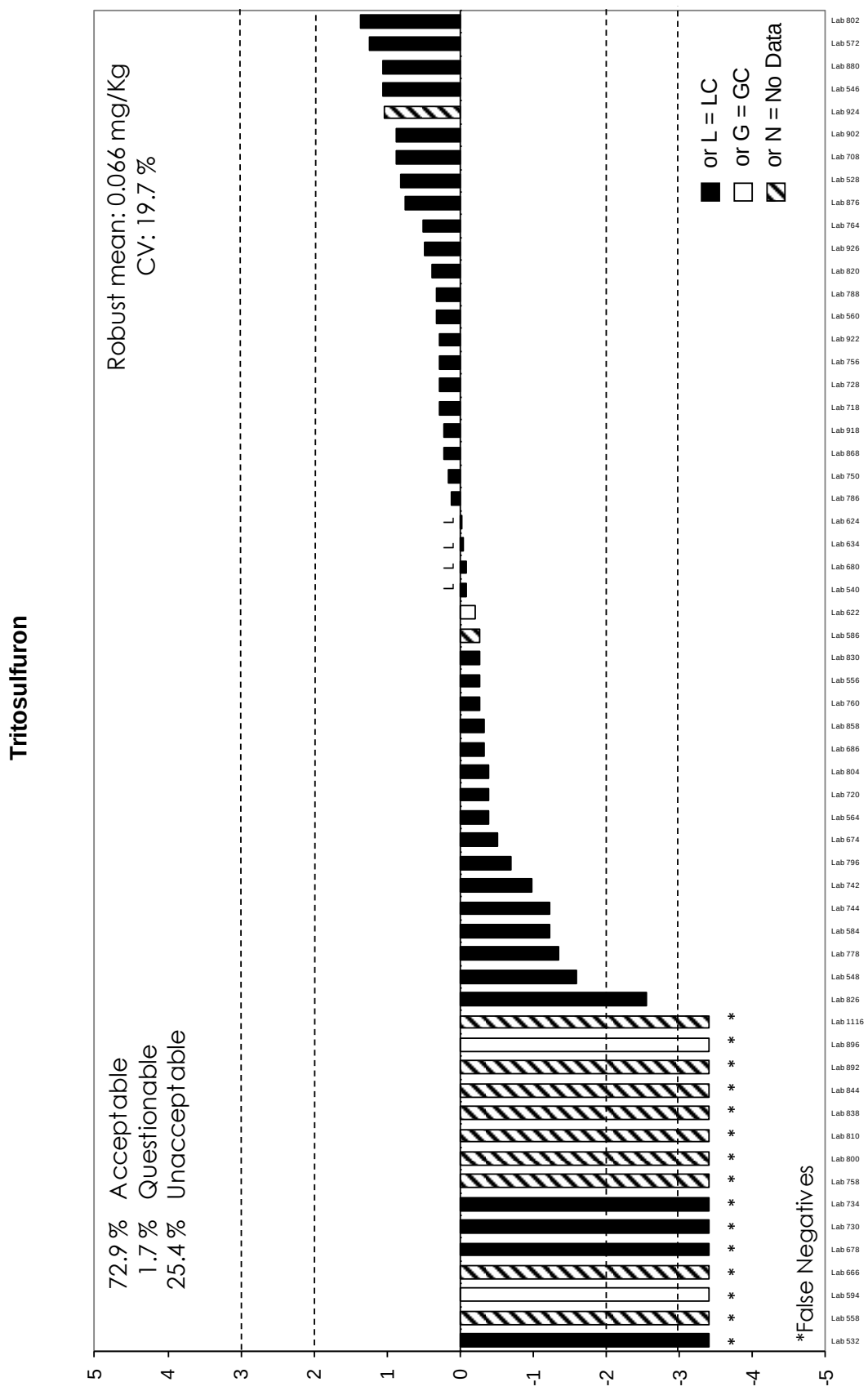
APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).



APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).



APPENDIX 4. Graphical representation of z scores for FFP-RSD (25 %).



APPENDIX 5. Average of the Squared z scores (AZ^2) for laboratories in Category A.

Lab Code	Acetamiprid	Chlorantraniliprole	Chlorpropham	Chlorpyrifos	Clothianidin	Diazinon	Difenoconazole	Dimethoate	Fenamidone	Fluxapyroxad	Metaflumizone (sum of E- and Z- isomers)	Propamocarb (only parent compound)	Propyzamide	Pyraclostrobin	Teflubenzuron	Trifloxystrobin	Triflumuron	No. of z scores	AZ^2
	Z score																		
524	0.1	-0.2	-0.3	-0.3	0.0	-0.5	-0.7	-0.1	4.5	-0.1			0.0	-0.4	-0.4	-0.4	-0.7	15	1.4
528	0.2	0.0	0.2	0.6	0.6	0.9	0.5	0.5	0.0	0.2	0.1	0.4	1.0	0.0	5.0	0.5	0.2	17	1.7
530	-0.3	-0.3	-0.4	0.1	0.0	0.1	-0.2	-0.2	0.4	0.0	1.1	0.1	-0.3	0.0	-0.4	0.1	0.4	17	0.1
532	0.3	0.4	0.3	0.2	0.2	0.3	0.7	0.9	0.7	0.3	1.7	0.8	0.1	0.1	-3.6	0.1	0.8	17	1.2
534	0.0	0.5	0.6	1.2	0.5	1.0	0.3	-0.3	0.3	0.0	-0.3	-0.6	0.8	1.0	1.6	0.3	-0.5	17	0.5
540	0.5	-0.1	0.4	0.4	0.4	1.8	0.5	0.0	0.6	0.2	1.0	0.8	0.3	0.0	0.3	0.7	0.7	17	0.4
544	-0.1	0.2	-0.2	-0.8	0.5	-0.3	-0.7	0.0	-0.6	-0.9	-1.9	-0.2	-0.8	-0.4	0.0	-0.5	-0.3	17	0.4
546	-0.1	-0.1	0.2	0.2	0.0	0.5	0.4	0.6	0.1	0.2	-0.5	-0.1	0.2	0.7	0.6	0.2	0.6	17	0.1
548	-0.4	-0.8	0.0	-0.6	-0.8	-0.5	-0.6	-0.2	-0.7	-0.4	-0.5	-0.5	-0.4	-0.6	-1.5	-0.3	-0.7	17	0.4
556	0.3	-0.3	-0.3	0.2	-0.2	-0.1	0.1	0.5	0.5	0.2	0.3	-0.5	-0.1	-0.3	0.9	-0.3	-0.1	17	0.1
558	-0.6	-0.4	0.3	-0.3	-0.5	-0.7	-0.7	-0.3	-0.7	-0.5	-0.4	1.0	-0.3	-0.8	0.9	-0.6	-0.5	17	0.4
560	0.0	-0.2	0.6	0.5	1.2	0.3	0.3	0.2	0.5	0.1	-1.1	0.3	0.4	-0.3	0.7	0.1	0.1	17	0.3
562	0.1	-0.3	0.6	-0.3	-1.4	0.3	-0.1	0.0	0.6	1.1	-1.0	-0.9	0.6	0.1	-0.4	-0.2	1.0	17	0.4
564	0.2	0.4	-0.1	0.3	-0.5	-0.1	0.7	0.0	1.9	1.7	-0.1	0.0	-0.2	0.4	-1.2	1.0	-0.2	17	0.6
566	0.0	-0.1	-0.8	-0.6	0.1	-0.2	0.1	0.0	0.0	-0.4	2.3	-0.8	-0.1	-0.3	-0.3	0.2	-0.5	17	0.5
568	0.5	0.7	-0.7	-0.5	0.8	-0.8	0.9	-0.5	-0.6	0.6	-0.4	1.3	-0.9	1.0	0.1	-0.5	0.6	17	0.5
580	-0.2	-0.1	0.3	0.3	-0.2	0.2	0.1	0.0	0.3	1.0	0.3	-0.3	-0.1	0.5	-0.1	0.4	0.5	17	0.1
582	-0.3	-0.2	0.0	0.2	0.0	2.3	0.0	-0.3	0.3	-0.1	0.7	-0.2	-0.2	-0.2	-0.3	0.2	1.6	17	0.5
584	0.4	0.4	-0.8	-1.1	0.6	-1.1	-1.2	0.5	-0.7	-0.9	-0.4	-0.5	-0.6	-1.2	-1.0	-0.9	-0.8	17	0.7
586	-0.3	-0.3	0.4	0.0	0.2	0.9	0.1	-0.4	-0.1	1.1	0.9	-0.6	0.9	0.3	-0.4	0.0	-0.2	17	0.3
588	0.8	1.6	-0.8	-0.2	0.4	-1.3	-0.2	0.5	-0.8	-0.3		0.5	-0.6	0.6	3.6	0.9	-0.4	16	1.4
590	0.4	0.1	0.4	0.9	-0.1	0.2	0.1	0.1	-0.1	0.1	-0.3	-0.5	0.0	0.4	0.1	0.2	0.1	17	0.1
592	0.5	0.0	0.1	0.9	0.4	0.2	-0.3	0.4	0.5	0.3	-1.6	-0.8	0.3	-0.3	-0.5	0.6	-0.3	17	0.3
594	-0.8	-0.4	-1.0	-1.2	-0.3	-1.4	-1.6	-1.1	-0.5	-0.4	-2.2	-0.4	-0.9	-1.3	-1.4	-1.3	-2.8	17	1.7
596	-0.2	-0.3	-0.9	-0.4	-0.2	-0.9	-0.5	0.0	-0.7	-1.0	-1.3	0.2	-0.5	-0.8	-0.1	-0.7	-0.2	17	0.4
598	-0.5	-0.7	-0.7	0.5	-0.8	-0.3	-0.5	-0.7	-0.2	-0.5	0.3	0.2	0.3	-0.3	-0.3	-0.6	-3.9	17	1.1
602	-0.3	-1.2	-1.2	-1.6	0.8	-1.4	-0.9	1.2	-1.5	-0.9	-0.6	-2.1	-1.0	-0.6	-1.2	-0.5	-1.3	17	1.3
604	0.1	0.6	0.2	0.1	-0.2	-0.5	0.4	0.1	-0.3	-0.1	0.3	-0.3	-0.3	-0.1	0.9	-0.1	0.5	17	0.1
606	0.4	1.0	2.2	1.2	1.0	0.4	0.3	0.8	0.5	0.5	-0.4	-0.5	1.8	2.3	-0.4	1.0	0.6	17	1.2
610	-0.3	0.3	-0.1	-0.3	-0.1	-0.1	-0.2	-0.3	0.1	0.3	0.7	-0.7	-0.4	-0.6	-0.6	0.1	0.8	17	0.2
616	0.2	0.4	-1.3	1.1	-0.2	1.0	0.9	0.5	0.1	0.4	-1.1	0.1	0.2	0.8	-0.4	0.1	0.0	17	0.4
618	-0.2	-0.3	-0.4	-0.4	-0.4	-0.1	-0.5	-0.2	-0.4	-0.6	0.0	0.2	-0.5	-0.2	-0.5	-0.3	-0.7	17	0.2
622	-0.3	-0.6	0.2	0.2	0.9	0.2	-0.3	0.1	-0.3	0.8	0.4	-0.7	-0.1	-0.3	-0.6	-0.3	-0.2	17	0.2
624	0.3	-0.1	0.8	0.9	0.3	0.4	0.2	0.2	0.1	-0.1	-0.6	0.2	0.5	-1.1	-0.4	0.6	-0.8	17	0.3
626	2.4	0.9	0.0	0.6	0.0	0.2	-0.4	1.7	0.1	1.4	3.6	-0.1	-0.4	1.4	0.7	0.3	1.6	17	1.8
632	-0.1	-0.4	1.6	0.7	0.0	2.3	0.4	0.0	0.7	2.6	1.3	0.0	1.0	0.1	-0.5	0.3	3.1	17	1.7
634	0.7	0.1	-0.1	0.1	0.4	0.3	0.5	0.7	0.7	0.8	-0.9	0.9	0.8	0.4	0.6	0.4	0.3	17	0.3
636	-0.6	-0.5	0.5	-0.1	0.1	0.0	0.0	0.1	-0.6	0.0	1.0	-0.7	-0.4	-0.3	-0.7	0.0	0.2	17	0.2
640	-0.1	-0.3	-0.8	-0.3	0.1	-0.8	-0.8	0.2	-0.8	-0.2	2.4	-0.3	-0.8	-0.3	-0.2	-0.7	-0.2	17	0.6
642	-0.5	-0.6	-0.8	-0.8	-0.3	-0.6	-0.9	-0.6	-0.1	-0.2	-1.1	-0.1	-0.6	-0.5	-0.6	-0.2	-0.3	17	0.3
646	-0.5	-0.6	-0.7	-0.4	-0.3	-0.5	-0.7	-0.4	0.1	-0.3	-1.1	-0.3	-0.4	-0.2	-0.6	-0.3	0.0	17	0.3
648	0.0	1.1	0.8	0.1	-0.3	-0.7	-0.9	-0.2	-0.4	-0.4	-1.0	-0.6	-0.4	0.2	0.5	-0.2	1.2	17	0.4
654	-0.6	0.1	0.5	0.1	-0.2	-0.1	0.0	-0.1	0.0	0.0	0.3	0.9	0.4	0.3	-0.1	-0.3	0.2	17	0.1

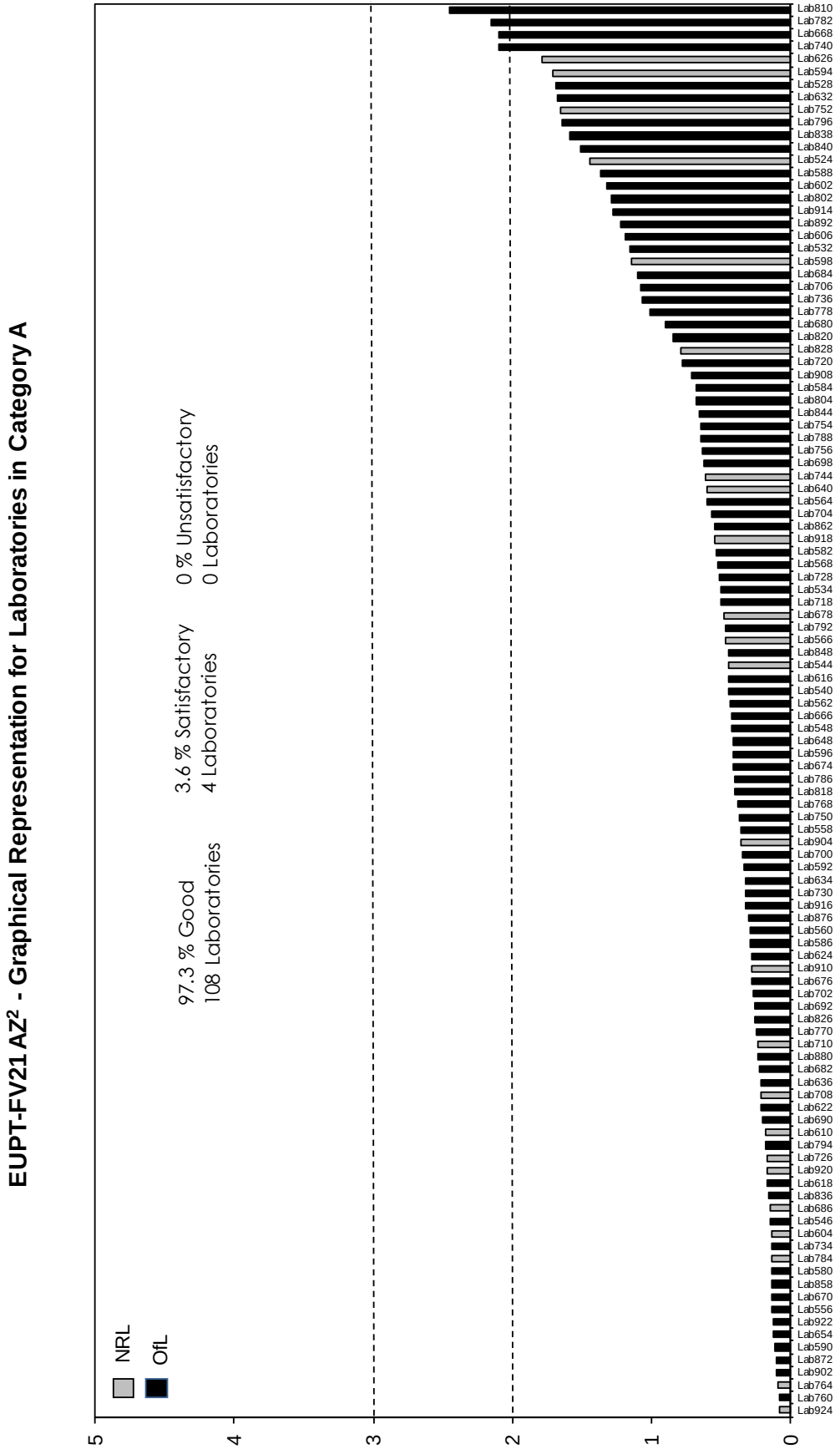
APPENDIX 5. Average of the Squared z scores (AZ^2) for laboratories in Category A.

Lab Code	Acetamiprid	Chlorantraniliprole	Chlorpropham	Chlorpyrifos	Clothianidin	Diazinon	Difenoconazole	Dimethoate	Fenamidone	Fluxapyroxad	Metaflumizone (sum of E- and Z- isomers)	Propamocarb (only parent compound)	Propyzamide	Pyraclostrobin	Teflubenzuron	Trifloxystrobin	Triflumuron	No. of z scores	AZ^2
	Z score																		
666	-0.3	-0.3	0.0	1.8	0.2	0.6	1.0	-0.4	0.6	0.3	-0.6	-0.5		0.0	0.4	0.6	-0.2	16	0.4
668	-0.1	0.7	-0.4	0.9	-0.1	-0.4	0.3	0.8	0.7	0.8	-3.8	1.2	-0.4	1.0	-3.6	0.3	1.3	17	2.1
670	0.1	-0.2	-0.2	-0.9	0.1	0.0	-0.2	0.2	0.0	0.0	-0.9	0.2	-0.3	-0.4	-0.4	-0.2	-0.3	17	0.1
674	0.8	-0.8	-0.4	-1.3	0.1	-0.5	-0.4	0.8	0.0	0.0	0.2	-0.9	-0.2	-0.5	-0.6	0.2	-0.9	17	0.4
676	-0.2	-0.7	0.0	0.2	-0.9	0.0	0.5	0.0	0.2	0.4	-1.3	0.0	0.0	0.3	-0.9	0.4	-0.1	17	0.3
678	1.5	0.4	0.0	-0.5	0.7	-0.4	0.6	1.3	1.1		0.0	0.2	-0.1	0.6	0.0	0.5	0.4	16	0.5
680	-0.4	-0.7	-3.5	0.2	-0.8	0.0	-0.3	-0.2	0.1	0.0	-0.9	0.2	0.2	-0.2	0.2	-0.2	-0.7	17	0.9
682	0.2	-0.3	0.7	-0.2	0.1	0.4	-0.3	-0.4	-0.2		-0.7	0.1	0.5	-0.4	0.1	0.0	1.2	16	0.2
684	0.8	0.6	-0.7	-0.4	-0.2	-0.5	0.2	0.2	2.3	2.3	-0.3	-0.3	0.6	-0.1	-0.8	2.2	0.1	17	1.1
686	0.7	-0.1	0.3	0.2	0.6	0.8	0.2	0.2	-0.1	0.0	0.3	0.0	0.7	0.1	0.1	0.4	0.2	17	0.1
690	0.0	-0.3	-0.2	-0.3	-0.5	0.0	0.1	-0.6	-0.3	-0.5	-0.7	0.9	-0.4	-0.4	-0.3	-0.6	-0.4	17	0.2
692	-0.3	-0.3	0.6	1.0	-1.2	0.4	0.0	0.0	0.4	-0.2	0.5	0.1	0.8	-0.4	-0.4	0.2	0.0	17	0.3
698	-0.1	0.7	0.1	0.3	-0.9	0.5	0.4	0.0	-0.4	-0.2	1.4	0.8	-0.6	1.0	0.7	0.5	-1.9	17	0.6
700	-0.3	0.4	-0.2	1.2	-0.3	0.2	0.0	-0.3	-0.3	-0.3	-0.1	-0.2	-0.3	0.0	1.8	0.2	-0.4	17	0.3
702	0.5	0.4	0.2	0.5	0.5	-0.4	0.7	0.1	0.8	0.3	-0.1	0.4	1.4	0.3	0.0	-0.2	-0.1	17	0.3
704	-0.8	1.1	0.4	0.2	-1.4	0.2	0.2	-0.6	0.9	0.0	1.2	-0.9	0.7	0.5	1.2	0.0	0.5	17	0.6
706	0.3	-0.5	-0.3	0.0	-0.5	0.0	-0.2	-0.1	0.2	-3.9	-0.2	1.3	-0.4	-0.1	0.4	-0.2	-0.2	17	1.1
708	0.1	0.2	0.0	0.0	0.5	0.2	-0.2	0.2	0.4	-0.1	1.6	0.3	-0.1	0.4	0.1	0.5	0.4	17	0.2
710	0.1	0.1	0.1	0.2	0.3	-0.3	-1.0	0.3	-0.2	-0.5	1.3	-0.5	-0.1	-0.6	0.0	0.0	0.2	17	0.2
712	-0.3	-0.4	-0.2	-0.3	-0.4	-0.5	-0.4	-0.6	0.4	0.0	-0.8	-0.6	-0.4	-0.4	2.7	-0.1	0.1	17	0.6
714	0.0	-1.6	-3.5	-2.2	0.1	-2.3	-1.0	-0.2	-1.2	-0.8	-1.8	0.9	-0.5	-1.4	-2.0	-1.6	-1.0	17	2.5
718	0.5	0.0	0.1	-1.6	0.3	1.0	0.7	0.2	1.0	-0.1	1.0	-1.3	0.4	0.0	0.3	0.2	0.0	17	0.5
720	-0.5	-1.1	0.7	1.8	-0.2	0.5	0.5	0.9	0.7	1.0	0.1	0.4	0.2	0.2	1.0	0.5	1.9	17	0.8
726	0.4	-0.4	-0.3	-0.7	-0.2	-0.6	0.2	0.1	-0.2	0.0	-0.3	-0.7	-0.6	0.4	0.1	-0.6	0.2	17	0.2
728	-0.5	-0.7	-0.8	-1.3	0.2	-1.1	-0.3	-0.1	-0.6	0.0	-0.1	1.2	-0.5	-0.2	-0.8	-1.3	0.0	17	0.5
730	-0.5	0.8	0.8	0.3	0.6	0.4	0.0	0.2	0.0	0.2	0.0	0.7	0.8	0.7	1.2	0.2	0.1	17	0.3
734	-0.2	-0.5	-0.4	-0.4	-0.5	-0.1	-0.3	-0.1	-0.3	-0.4	0.6	0.2	-0.3	-0.1	-0.6	0.2	-0.5	17	0.1
736	-0.2	-1.0	-3.5	-0.1	0.3	0.4	-0.6	0.1	-0.2		-0.7	-1.0	-0.2	-0.2	-0.3	-0.2	1.0	16	1.1
740	-0.3	1.5	1.9	2.0	-0.1	2.1	1.7	0.0	0.9		0.9	-0.6	1.1	2.1		2.0	1.6	15	2.1
744	0.1	2.6	0.4	0.3	-0.1	0.7	-0.2	0.0	0.2	0.0	-0.2	-0.4	0.8	0.3	1.2	0.6	-0.4	17	0.6
750	0.8	0.6	0.3	0.3	0.5	-0.1	-0.2	0.6	-0.6	0.3	-0.3	-0.2	1.0	0.1	0.6	-0.1	-1.4	17	0.4
752	-0.2	-0.5	0.0	-0.4	-0.6	-0.2	-0.5	-0.4	-0.2	-0.2	-0.9	0.1	0.9	-0.1	5.0	-0.3	-0.4	17	1.7
754	-1.4	-0.4	0.4	0.1	-1.2	-0.1	-0.3	-1.4	-0.4		0.0	-1.7	-0.3	0.8	0.9	-0.2	-0.2	16	0.6
756	0.2	-0.2	-0.1	-2.0	0.4	0.3	-0.5	0.3	0.4	0.0	-0.8	-0.2	0.2	-0.9	-0.8	-0.7	-1.8	17	0.6
760	0.1	-0.1	0.2	0.2	0.3	-0.1	0.0	0.4	0.0	0.6	-0.7	0.2	0.1	-0.3	0.2	-0.1	-0.2	17	0.1
764	-0.1	0.3	-0.1	-0.1	0.1	-0.4	0.1	0.1	0.4	0.2	0.4	-0.1	-0.4	-0.6	0.2	-0.2	0.1	17	0.1
768	-0.6	-0.2	0.1	-0.7	1.0	0.1	-0.5	0.2	-0.3	0.0	1.4	1.0	0.4	-0.2	-0.1	-0.2	0.9	17	0.4
770	0.0	1.3	0.2	0.6	0.8	0.1	0.3	0.4	0.2	0.1	-0.3	-0.3	0.0	-0.1	1.0	0.3	0.1	17	0.2
778	-0.6	-0.9	-1.3	-0.9	-0.5	-1.2	-1.5	-0.4	-1.4	-1.5	0.3	1.0	-0.5	-1.3	-0.1	-0.9	-1.1	17	1.0
782	0.9	1.0	1.5	1.1	-0.1	1.5	2.2	0.9	1.6		2.0	0.5	0.8	2.4	2.0	1.9	0.7	16	2.2
784	0.0	-0.3	-0.5	-0.2	-0.2	-0.3	-0.4	-0.1	-0.4	-0.5	0.7	0.4	-0.4	-0.2	-0.3	0.0	-0.5	17	0.1
786	-0.3	-0.5	-0.7	-1.0	-0.6	-0.8	-1.1	0.0	-0.4	-0.5	0.6	-0.1	-0.8	-0.6	-0.9	0.7	-0.1	17	0.4
788	0.8	0.3	-1.4	-0.6	0.9	1.0	1.8	0.5	0.4	-0.6	-0.1	-0.3	-1.1	0.7	0.4	0.0	0.3	17	0.6
792	-0.3	-0.6	-0.6	-0.5	-1.5	-0.7	0.4	-0.4	-0.2	-0.5	0.6	-0.4	-0.6	0.7	-1.5	0.0	-0.1	17	0.5

APPENDIX 5. Average of the Squared z scores (AZ^2) for laboratories in Category A.

Lab Code	Acetamiprid	Chlorantraniliprole	Chlorpropham	Chlorpyrifos	Clothianidin	Diazinon	Difenoconazole	Dimethoate	Fenamidone	Fluxapyroxad	Metaflumizone (sum of E- and Z- isomers)	Propamocarb (only parent compound)	Propyzamide	Pyraclostrobin	Teflubenzuron	Trifloxystrobin	Triflumuron	No. of z scores	AZ^2
	Z score																		
794	-0.2	-0.3	-0.2	-0.4	-0.9	-0.1	-0.4	0.0	-0.4	-0.3	-0.8	0.0	-0.3	-0.4	-0.3	-0.5	-0.2	17	0.2
796	-0.7	0.4	-0.2	0.2	-0.2	0.0	-1.2	-0.2	0.1	-0.1	0.6	0.1	-0.5	-0.1	0.4	0.2	5.0	17	1.6
802	1.1	-0.1	-0.2	0.0	0.7	-0.2	1.4	-0.3	0.2	2.0	-2.3	-0.2	-2.1	-0.8	-1.8	0.2	0.4	17	1.3
804	-0.3	-0.2	0.1	-0.5	-0.6	-0.2	-0.4	-0.1	-0.4	0.1	2.9	0.0	-0.6	0.2	0.0	-0.5	1.1	17	0.7
810	3.9	0.4	0.2	-0.1	0.4	-0.4	2.2	4.1	-0.1	0.4	-0.5	-0.1	-0.3	0.6	0.5	1.8	0.3	17	2.4
818	-0.3	-0.3	-0.3	-0.9	-0.4	-0.5	-0.7	-0.2	-0.8	-0.9	0.6	-0.4	-0.4	-0.5	-1.1	-0.8	-0.7	17	0.4
820	-0.3	-0.2	-0.3	-0.9	-1.3	-0.7	-0.4	-0.4	-0.4	-0.3	2.5	0.5	-0.3	-0.9	0.7	-1.6	-0.5	17	0.8
824	0.4	0.6	0.1	-0.1	-0.2	-0.1	-0.2	1.5	0.3	0.0	-0.9	0.8	0.1	0.2	-0.4	0.0	-0.5	17	0.3
826	0.4	0.1	0.5	0.7	0.2	0.2	0.0	0.2	-0.1	-0.3	1.3	0.2	0.1	-0.2	1.1	0.0	-0.2	17	0.3
828	-0.5	-0.8	-0.9	-0.4	-0.3	-0.8	-1.0	-0.1	-1.1	-1.0	-1.6	0.2	-1.0	-0.9	-0.9	-0.9	-1.3	17	0.8
836	-0.3	0.0	0.0	-1.1	-0.2	-0.2	-0.3	-0.1	0.0	0.2	-0.7	0.5	0.0	0.3	0.4	0.1	0.4	17	0.2
838	0.2	1.0	0.1	0.1	0.4	0.1	-0.4	0.2	-0.2	-0.3	4.7	1.0	-0.1	0.3	-0.7	-1.2	-0.8	17	1.6
840	0.4	0.1	0.8	0.9	0.4	0.8	0.5	0.5	0.8	4.5	-0.3	0.6	0.9	0.5	0.3	0.5	0.6	17	1.5
844	-0.3	-0.2	0.8	-0.5	-0.4	0.1	0.0	-0.4	-1.3	0.4		-0.2	-0.3	-1.2	0.0	0.3	-2.4	16	0.6
848	0.3	1.0	0.5	0.9	0.2	0.3	0.6	0.3	0.6	0.7	1.0	-0.6	0.8	0.6	0.4	0.7	0.9	17	0.4
858	0.6	0.2	0.2	0.1	0.1	-0.5	0.0	0.2	0.0	-0.3	0.9	0.7	-0.1	-0.2	-0.1	-0.1	-0.3	17	0.1
862	1.4	0.2	-0.6	-0.5	-0.9	-0.5	-1.0	-0.2	-0.1		-0.2	0.6	-0.6	0.3	1.7	0.1	-0.2	16	0.5
872	-0.3	-0.3	0.5	-0.2	0.2	0.4	0.0	-0.3	-0.3	0.0	-0.3	0.7	0.2	0.1	-0.2	0.0	-0.4	17	0.1
876	0.2	-0.1	-0.8	0.7	-0.1	-0.9	-0.8	-0.4	-0.1	-0.2	-0.3	0.4	-0.4	0.5	-0.7	-0.7	-0.9	17	0.3
880	-0.3	0.0	0.3	0.4	0.5	0.5	0.7	-0.3	0.1	0.1	0.7	1.2	0.1	-0.2	0.6	0.3	0.0	17	0.2
892	0.3	0.2	-0.8	-0.5	0.6	-1.1	0.4	0.1	0.6	-3.9	-1.0	0.1	-0.5	0.5	0.0	0.5	0.7	17	1.2
902	0.4	0.3	0.3	0.2	-0.3	-0.1	0.1	0.0	-0.1	0.3	-0.8	0.0	-0.3	0.3	-0.5	0.0	0.0	17	0.1
904	-0.7	-0.7	0.1	0.0	-0.7	0.0	-0.3	-0.6	-0.3	-1.3	-0.2	-0.2	0.1	-0.7	-0.1	-0.9	-0.9	17	0.3
908	-0.1	-0.8	-0.7	-0.9	-0.2	-0.3	-0.7	-0.1	-0.5		-2.3	-0.7	-1.1	-0.3	1.1	-0.2	-0.6	16	0.7
910	-0.1	0.0	0.4	1.2	-0.2	0.5	1.2	0.2	-0.1	-0.2	-0.9	0.0	0.2	0.2	0.3	0.4	0.4	17	0.3
914	-0.4	0.2	-1.6	-0.4	-0.1	0.0	-0.4	-0.7	-3.9	-0.3	0.9	0.7	-0.7	-0.6	0.2	-0.4	-0.3	17	1.3
916	-0.2	-0.8	-0.6	-0.1	-0.2	-0.1	-0.5	-0.6	-0.2	-0.4	-0.2	-0.3	0.0	-0.7	-1.2	-0.9	-0.7	17	0.3
918	0.3	0.3	0.3	1.0	0.7	0.5	0.3	0.5	-1.1	-0.9	-0.1	1.8	0.4	0.7	0.4	0.7	-0.4	17	0.5
920	-0.6	-0.2	0.3	-0.5	0.5	-0.1	-0.2	0.3	-0.1	-0.1	0.8	0.2	-0.4	-0.2	-0.5	-0.6	-0.3	17	0.2
922	0.6	-0.2	0.3	0.3	0.2	0.1	-0.4	0.2	-0.2	0.2	0.4	0.5	0.2	0.4	-0.4	-0.7	0.1	17	0.1
924	0.0	0.0	0.2	0.4	0.3	0.2	0.4	0.2	0.2	0.3	-0.5	0.2	0.2	0.3	0.3	0.3	-0.2	17	0.1

APPENDIX 6. EUPT-FV-20 AZ² graphical representation for EU/EFTA laboratories in Category A.



8th Edition
Revised: January 2018

GENERAL PROTOCOL for EU Proficiency Tests for Pesticide Residues in Food and Feed

Introduction
This protocol contains general procedures valid for all European Union Proficiency Tests (EUPTs) organised on behalf of the European Commission, DG-SANTE[5] by the four European Union Reference Laboratories (EURLs) responsible for pesticide residues in food and feed. These EUPTs are directed at laboratories belonging to the Network[6] of National Reference Laboratories (NRLs) and Official Laboratories (OfLs) of the EU Member States. OfLs from EFTA countries and EU-Candidate countries are also welcome to participate in the EUPTs. OfLs from Third countries may be permitted to participate on a case-by-case basis.

The following four EURLs for pesticide residues were appointed by DG-SANTE based on regulation (EC) 625/2017[7]:

- EURL for Fruits and Vegetables (EURL-FV).
- EURL for Cereals and Feedingstuffs (EURL-CF).
- EURL for Food of Animal Origin and Commodities with High Fat Content (EURL-AO) and
- EURL for pesticides requiring Single Residue Methods (EURL-SRM).

The aim of these EUPTs is to obtain information regarding the quality, accuracy and comparability of pesticide residue data in food and feed reported to the European Union within the framework of the national control programmes and the EU multiannual co-ordinated control programme[8]. Participating laboratories will be provided with an assessment of their analytical performance that they can use to demonstrate their analytical performance and compare themselves with other participating laboratories.

EUPT-Organizers and Scientific Committee
EUPTs are organised by individual EURLs. or by more than one EURL, in joint collaboration.

An **Organising Team** is appointed by the EURL(s) in charge. This team is responsible for all administrative and technical matters concerning the organisation of the PT. e.g. the PT-announcement, production of Test Item and Blank Material, the undertaking of homogeneity and stability tests, packing and shipment of the Test Item and Blank Material, handling and evaluation of the results and method information submitted by the participants and the drafting of the preliminary and final reports.

To complement the internal expertise of the EURLs, a group of external consultants that form the **EUPT-Scientific Committee** (EUPT-SC)[9] has been established and approved by DG-SANTE. The EUPT-SC consists of expert scientists with many years of experience in PTs and/or pesticide residue analysis. The actual composition of the EUPT-SC, the affiliation of each member is shown on the EURL-Website. The members of the EUPT-SC will also be listed in the Specific Protocol and the Final Report of each EUPT.
The EUPT-SC is made up of the following two subgroups:

a) An independent **Quality Control Group** (EUPT-QCG) and
b) An **Advisory Group** (EUPT-AG).

The EUPT-SC's role is to help the Organisers make decisions regarding the EUPT design: the selection of the commodity, the selection of pesticides to be included in the Target Pesticide List (see below), the establishment of the Minimum Required Reporting Levels (MRRLs), the statistical treatment and evaluation of participants results (in anonymous form), and the drafting and updating of documents such as the General and Specific PT Protocols and the Final EUPT-Reports.

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[5] DG-SANTE = European Commission, Health and Food Safety Directorate-General

[6] For more information about the EURL/NRL/OfL-Network please refer to the EURL-Web-portal under: http://www.eurl-pesticides.eu

[7] Regulation (EU) 2017/625 of the European Parliament and of the Council on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products. Published at OJ of the EU L95 of 07.04.2017

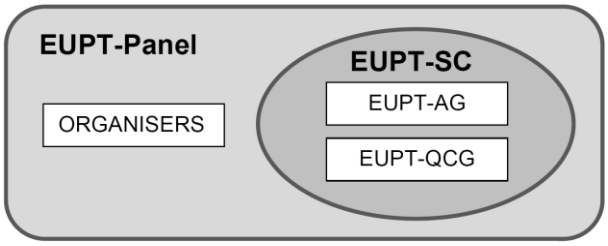
[8] European Commission Proficiency Tests for Pesticide Residues in Fruits and Vegetables, Trends in Analytical Chemistry, 2010, 29 (1), 70 – 83.

[9] Link to the List of current members of the EUPT Scientific Committee: http://www.eurl-pesticides.eu/library/docs/allcrl/EUPT-SC.pdf

The EUPT-QCG has the additional function of supervising the quality of EUPTs and of assisting the EURLs in confidential aspects such as the choice of the pesticides to be present in the Test Item and the concentrations at which they should be present.

The EUPT-SC typically meets once a year, after the EUPTs of all four pesticide EURLs have been conducted, to discuss the evaluation of the EUPT-results and to consult with the EURLs in their decision making. Upcoming EUPTs are also planned during these meetings.

The EUPT-Organising Team and the EUPT-SC together form the **EUPT-Panel**.



The decisions of the EUPT-Panel will be documented.

This present EUPT General Protocol was jointly drafted by the EUPT-SC and the EURLs and was approved by DG-SANTE.

EUPT Participants
Within the European Union all NRLs operating in the same area as the organising EURL, as well as all OfLs whose scope overlaps with that of the EUPT, are legally obliged to participate in EUPTs. The legal obligation of NRLs and OfLs to participate in EUPTs arises from:

- Art. 28 of Reg. 396/2005/EC[10] (for all OfLs analysing for pesticide residues within the framework of official controls[11] of food or feed)
- Art. 101 (1)(a) of Reg. (EC) 625/2017 (for all NRLs)

The four EURLs will annually issue and distribute, via the EURL-website, a joint list of all OfLs that must participate in each of the EUPTs to be conducted within a given year. The list of obliged labs will be updated every year to take account of any changes in the lab profiles. Interim updates will be issued to eliminate any possible errors.

NRLs are responsible for checking whether all relevant OfLs within their network are included in the list of obligated laboratories and whether the contact information and commodity-scopes are correct.

OfLs are furthermore urged to keep their own profiles within the EURL-DataPool up-to-date, especially their commodity and pesticide scopes and their contact information.

Labs that are obliged to participate in a given EUPT, and that are not able to participate, must provide the reasons for their non-participation without prejudice of any legal action taken against them for not participating. This also applies to any participating laboratories that then fail to report results.

Based on Reg. (EC) 625/2017, OfLs not paying the EUPT sample delivery fee will be initially warned that their participation in subsequent EUPTs could be denied. In case of a repetitive non-payment, the EUPT organisers will inform the competent authority to take action.

Confidentiality and Communication
The proprietor of all EUPT data is DG-SANTE and as such has access to all information.

For each EUPT, the laboratories are given a unique code (lab code), initially only known to themselves and the Organisers. In the final EUPT-Report, the names of participating laboratories will not be linked to their laboratory codes. It should be noted, however, that the Organisers, at the request by DG-SANTE, may present the EUPT-results on a country-by-country basis. It may therefore be possible that a link between codes and laboratories could be made, especially for those countries where only one laboratory has participated. Furthermore, the EURLs reserve the right to share EUPT results and codes amongst themselves: for example, for the purpose of evaluating overall lab or country performance as requested by DG-SANTE.

[10] Regulation (EC) No 396/2005, published at OJ of the EU L70 of 16.03.2005, as last amended by Regulation 839/2008 published at OJ of the EU L234 of 30.08.2008.
[11] Official controls in the sense of Reg. (EC) 625/2017, this includes labs involved in controls within the framework of national and/or EU-controlled programmes as well as labs involved in import controls according to Regulation 669/2009/EC.

As laid down in Regulation 625/2017, NRLs are responsible for supporting and improving their own OfL-Network. On request from the NRLs, the EURLs will provide them with the PT-codes of the participating OfLs belonging to their OfL-Network. This will allow NRLs to follow the participation and performance of the laboratories within their network.
Communication between participating laboratories during the test on matters concerning a PT exercise is not permitted from the start of the PT exercise until the distribution of the preliminary report.
For each EUPT the organising EURL prepares a specific EUPT-Website where all relevant documents in their latest version are linked.

The official language used in all EUPTs is English.

Announcement / Invitation Letter
At least 3 months before the distribution of the Test Item the EURLs will publish an Announcement/Invitation letter on the EURL-web-portal and distribute it via e-mail to the NRL/OfL mailing list available to the EURLs. This letter will inform about the commodity to be used as Test Item, as well as links to the tentative EUPT-Target Pesticide List and the tentative EUPT-Calendar.

Target Pesticide List
This list contains all analytes (pesticides and metabolites) to be sought, along with the Minimum Required Reporting Levels (MRRLs) valid for the specific EUPT. The MRRLs are typically based upon the lowest MRLs found either in Regulation 396/2005/EC or Commission Directive 2006/125/EC (Baby Food Directive).

Labs must express their results as stated in the Target Pesticides List.

Specific Protocol
For each EUPT the organizing EURL will publish a Specific Protocol at least 2 weeks before the Test Item is distributed to the participating laboratories. The Specific Protocol will contain all the information previously included in the Invitation Letter but in its final version, information on payment and delivery, instructions on how to handle the Test Item upon receipt and on how to submit results, as well as any other relevant information.

Homogeneity of the Test Item
The Test Item will be tested for homogeneity typically before distribution to participants. The homogeneity tests involve the analysis of two replicate analytical portions, taken from at least ten randomly chosen units of treated Test Item. Both sample preparation and measurements should be conducted in random order.

The homogeneity test data are statistically evaluated according to ISO 13528, Annex B or to the International Harmonized Protocols jointly published by ISO, AOAC and IUPAC. The results of all homogeneity tests are presented to the EUPT-SC. In special cases, where the above homogeneity test criteria are not met, the EUPT-SC considering all relevant aspects (e.g. the homogeneity results of other pesticides spiked at the same time, the overall distribution of the participants' results, the analytical difficulties faced during the test, knowledge of the analytical behaviour of the pesticide question) may decide to overrule the test. The reasons of this overruling have to be transparently explained in the Final EUPT-Report.

Stability of the analytes contained in the Test Item
The Test Items will also be tested for stability - according to ISO 13528, Annex B. The time delay between the first and the last stability test must exceed the period of the EUPT-exercise. Typically the first analysis is carried out shortly before the shipment of the Test Items and the last one shortly after the deadline for submission of results. To better recognise trends and gain additional certainty one or more additional tests may be conducted by the Organisers. At least 6 sub-samples (analytical portions) should be analysed on each test day (e.g. 2 analytical portions withdrawn from three randomly chosen containers OR 6 portions withdrawn from a single container). In principle all pesticides contained in the Test Item should be checked for stability. However, in individual cases, where sufficient knowledge exists that the stability of a certain analyte is very unlikely to be significantly affected during storage (e.g. based on experience from past stability tests or knowledge of its physicochemical properties), the Organisers, after consultation with the EUPT-QCG, may decide to omit a specific stability test. The EUPT-SC will finally decide whether analytes for which the stability test was not undertaken will be included in the final report, considering all relevant aspects such as the distribution of the participant's results (CV*).

A pesticide is considered to be adequately stable if $| yi - y | \leq 0.3 \times \sigma pt$, where yi the mean value of the last period of the stability test, y is the mean value of the first period of the stability test and σpt the standard deviation used for proficiency assessment (typically 25% of the assigned value).

The results of all stability tests are presented to the EUPT-SC. In special cases where the above stability test criteria are not met, the EUPT-SC considering all relevant aspects (e.g. the past experience with the stability of the compound, the overall distribution the participants' results, the measurement variability, analytical difficulties faced during the test and knowledge about the analytical behaviour of the pesticide question) may decide to overrule the test. The reasons of this overruling will be transparently explained in the Final EUPT-Report.

The Organisers may also decide to conduct additional stability tests at different storage conditions than those recommended to the participants e.g. at ambient temperature.

Considering knowledge about the expected susceptibility of pesticides in the Test Item to possible losses, the Organisers will choose the shipment conditions to be such that pesticide losses are minimised (e.g. shipment of frozen samples, addition of dry ice). As shipment time can differ between labs/countries it is recommended that the Organisers conduct additional stability tests at conditions simulating shipment. Should critical losses be detected for certain pesticides the EUPT-SC will be informed (or the EUPT-QCG before or during the test). Case-by-case decisions may be taken considering all relevant aspects including the shipment time of the samples to each laboratory.

Methodologies to be used by the participants
Participating laboratories are instructed to use the analytical procedure(s) that they would routinely employ in official control activities (monitoring etc.). Where an analytical method has not yet been established routinely this should be stated.

General procedures for reporting results
Participating laboratories are responsible for reporting their own quantitative results to the Organiser within the stipulated deadline. Any pesticide that was targeted by a participating laboratory should be reported as "analysed". Each laboratory will be able to report only one result for each analyte detected in the Test Item. The concentrations of the pesticides detected should be expressed in 'mg/kg' unless indicated otherwise in the specific protocol.
The Test Item is intentionally treated with pesticides whereas the Blank Material is analysed to ensure that it does not contain any of the pesticides in the Target Pesticides List, at or above, the specified MRRLs. Both the Test Item and Blank Material have to be analysed by the participating laboratories and any pesticide detected in them must be reported.

Correction of results for recovery
According to the Method Validation and Quality Control Procedures for Pesticide Residues Analysis in Food and Feed[12], it is common practice that pesticide analysis results are not corrected for recovery if the recovery rates range between 70 and 120 %. Correction of results for recovery is recommended if the average recovery is significantly different from 100 % (typically if outside the 70 – 120 % range). Approaches for recovery correction explicitly stated in the DG-SANTE document are the use of recovery correction factors, the use of stable isotope labelled analogues of the target analytes as Internal Standards (ILISs), the 'procedural calibration' approach as well as the approach of 'standard addition' with additions of analyte(s) being made to analytical portions. Results may be corrected for recovery only in cases where this correction is applied in routine practice (including cases of MRL-violations). Laboratories are required to report whether their results were adjusted for recovery and, if a recovery factor was used, the recovery rate (in percentage) must also be reported. No recovery data are required where correction for recovery is automatic by adding amounts of analytes to the test portion for using the 'standard addition' approach, or isotopically-labelled internal standards (in both cases with spiking into the Test Item at the beginning of the extraction procedures) or procedural calibration. In these cases, the laboratories should report the actual approach that was followed.

Methodology information
All laboratories are requested to provide information on the analytical method(s) they have used. A compilation of the methodology information submitted by all participants is presented in an Annex of the final report or in a separate report. Where necessary the methods are evaluated and discussed, especially in those cases where the result distribution is not unimodal or very broad (e.g. CV* > 35 %). If no sufficient information on the methodology used is provided, the Organiser reserves the right not to accept the analytical results reported by the participants concerned or even refuse participation in the following PT.

Results evaluation
The procedures used for the treatment and assessment of results are described below.

- ***False Positives results***

  These are results of pesticides from the Target Pesticides List, that are reported, at or above, their respective MRRL although they were: (i) not detected by the Organiser, even after repeated analyses, and/or (ii) not detected by the overwhelming majority (e.g. > 95 %) of the participating laboratories that had targeted the specific pesticides. In certain instances, case-by-case decisions by the EUPT-Panel may be necessary.
  Any results reported lower than the MRRL will not be considered as false positives, even though these results should not have been reported.

[12] Document N° SANTE/11813/2017; Method Validation and Quality Control Procedures for Pesticide Residues Analysis in Food and Feed

- ***False Negative results***

  These are results for pesticides reported by the laboratories as 'analysed' but without reporting numerical values although they were: a) used by the Organiser to treat the Test Item and b) detected by the Organiser as well as the majority of the participants that had targeted these specific pesticides at or above the respective MRRLs. Results reported as '< RL' (RL= Reporting Limit of the laboratory) will be considered as not detected and will be judged as false negatives. In certain instances, case-by-case decisions by the EUPT-Panel may be necessary.

In cases of the assigned value being less than a factor of 3 times the MRRL, false negatives will typically not be assigned. The EUPT-Panel may decide to take case-by-case decisions in this respect after considering all relevant factors such as the result distribution and the reporting limits of the affected labs.

- ***Estimation of the assigned value (x_{pt})***

In order to minimise the influence of out-lying results on the statistical evaluation, the assigned value x_{pt} (= consensus concentration) will typically be estimated using robust estimate of the participant's mean (x*) as described in ISO 13528:2015[13], taking into account the results reported by EU and EFTA countries laboratories only. In special justifiable cases, the EUPT-Panel may decide to eliminate certain results traceably associated with gross errors (see "Omission or Exclusion of results" below) or to use only the results of a subgroup consisting of laboratories that have repeatedly demonstrated good performance for the specific compound in the past.

- ***Omission or Exclusion of results***

Before estimating the assigned value results associated with obvious mistakes have to be examined to decide whether they should be removed from the population. Such gross errors may include incorrect recording (e.g. due to transcription errors by the participant, decimal point faults or transposed digits, incorrect unit), calculation errors (e.g. missing factors), analysis of a wrong sample/extract (e.g. a spiked blank), use of wrong concentrations of standard solutions, incorrect data processing (e.g. integration of wrong peak), major deviations from the analytical procedure, inappropriate storage or transport conditions (in case of susceptible compounds), and the use of inappropriate procedures that demonstrably lead to significantly biased results (e.g. due to degradation or incomplete extraction). Where the Organisers (e.g. after the publication of the preliminary report) receive information of such gross errors, having a significant impact on a generated result, the affected results will be examined on a case-by-case basis to decide whether, or not, they should be excluded from the population used for robust statistics. Results may also be omitted e.g. if an inappropriate method has been used even if they are not outliers. All decisions to omit/exclude results will be discussed with the EUPT-SC and the reasoning for the omission of each result clearly stated in the final EUPT-Report. However, z scores will be calculated for all results irrespective of the fact that they were omitted from the calculation of the assigned value.
Omitted results might be interesting as they might give indications about possible source(s) of errors. The Organisers will thus ask the relevant lab(s) to provide feedback on possible sources of errors (see also "follow-up activities").

- ***Uncertainty of the assigned value***

The uncertainty of the assigned values $u(x_{pt})$ is calculated according to ISO 13528:2015 as:

$$u(x_{pt}) = 1.25\frac{s^*}{\sqrt{p}}$$

where s* is the robust standard deviation and p is the number of results.

In certain cases, and considering all relevant factors (e.g. the result distribution, multimodality), the number of submitted results, information regarding analyte homogeneity/stability, information regarding the use of methodologies that might produce a bias that were used by the participants), the EUPT-Panel may consider the assigned value of a specific analyte to be too uncertain and decide that the results should not be evaluated, or only evaluated for informative purposes. The provisions of ISO 13528:2015 concerning the uncertainty of the assigned value will be taken into account.

- ***Standard deviation of the assigned value (target standard deviation)***

The target standard deviation of the assigned value (FFP-σ_{pt}) will be calculated using a Fit-For-Purpose approach with a fixed Relative Standard Deviation (FFP-RSD) of 25 % as follows:

$$\text{FFP-}\sigma_{pt} = 0.25 \times x_{pt}$$

[13] DIN ISO 13528:2015, Statistical methods for use in proficiency testing by interlaboratory comparisons, International Organization for Standardization. Therein a specific robust method for determination of the consensus mean and standard deviation without the need for removal of deviating results is described (Algorithm A in Annex C).

ANNEX A. Protocols and Target lists of pesticides to be sought.

The percentage FFP-RSD is set at 25 % based on experience from results of previous EUPTs[14]. The EUPT-Panel reserves the right to also employ other approaches on a case-by-case basis considering analytical difficulties and experience gained from previous proficiency tests.

For informative purposes the robust relative standard deviation (CV*) is calculated according to ISO 13528:2015; Chapter 7.7 (Consensus value from participant results) following Algorithm A in Annex C.

- ***z scores***

This parameter is calculated using the following formula:

$$z_i = \frac{(x_i - x_{pt})}{FFP\text{-}\sigma_{pt}}$$

where x_i is the value reported by the laboratory, x_{pt} is the assigned value, and FFP-σ_{pt} is the standard deviation using FFP approach. Z scores will be rounded to one decimal place. For the calculation of combined z scores (see below) the original z scores will be used and rounded to one decimal place after calculation.

Any z scores > 5 will be typically reported as '> 5' and a value of '5' will be used to calculate combined z scores (see below).

Z scores will be interpreted in the following way. as is set in the ISO 17043:2010[15]:

$\|z\| \leq 2.0$	Acceptable
$2.0 < \|z\| < 3.0$	Questionable
$\|z\| \geq 3.0$	Unacceptable

For results considered as false negatives, z scores will be calculated using the MRRL or RL (the laboratory's Reporting Limit) if the RL < MRRL. The EUPT-Panel will decide whether, or not, these values should appear in the z score histograms.

- ***Category A and B classification***

The EUPT-Panel will decide if and how to classify the laboratories into two categories - A or B. Currently, laboratories that are able to analyse at least 90% of the compulsory pesticides in the target pesticides list, have correctly detected and quantified a sufficiently high percentage of the pesticides present in the Test Item (at least 90 %) and reported no false positives will have demonstrated 'sufficient scope' and can therefore be classified into Category A. For the 90% criterion the number of pesticides needed to be correctly analysed to have sufficient scope will be calculated by multiplying the number of compulsory pesticides from the Target Pesticides List by 0.9 and rounding to the nearest full number with 0.5 decimals being rounded downwards (see some examples in Table 1).

Table 1. No. of pesticides from the target pesticides list needed to be targeted or pesticides present in the Test Item that need to be correctly detected and quantified to have sufficient scope.

No. of compulsory pesticides present in the Test Item / Target Pesticides List (N)	90 %	No. of pesticides needed to be correctly detected and quantified / targeted to have sufficient scope (n)	n
3	2.7	3	N
4	3.6	4	
5	4.5	4	N - 1
6	5.4	5	
7	6.3	6	
8	7.2	7	
9	8.1	8	
10	9.0	9	
11	9.9	10	
12	10.8	11	
13	11.7	12	
14	12.6	13	
15	13.5	13	N - 2
16	14.4	14	

[14] Comparative Study of the Main Top-down Approaches for the Estimation of Measurement Uncertainty in Multiresidue Analysis of Pesticides in Fruits and Vegetables. J. Agric. Food Chem., 2011, 59(14), 7609-7619.
[15] ISO/IEC 17043:2010. Conformity assessment – General requirements for proficiency testing

No. of compulsory pesticides present in the Test Item / Target Pesticides List (N)	90 %	No. of pesticides needed to be correctly detected and quantified / targeted to have sufficient scope (n)	n
17	15.3	15	
18	16.2	16	
19	17.1	17	
20	18	18	
21	18.9	19	
22	19.8	20	
23	20.7	21	
24	21.6	22	
25	22.5	22	N - 3
26	23.4	23	

– ***Overall performance of laboratories - combined z scores***

For evaluation of the overall performance of laboratories within Category A, the Average of the Squared z score (AZ^2)[16,17] (see below) will be used. The AZ^2 is calculated as follows:

$$AZ^2 = \frac{\sum_{i=1}^{n} z_i^2}{n}$$

Where *n* is the number of z scores to be considered in the calculation. In the calculation of the AZ^2, z scores higher than 5 will be classified as 5. Based on the AZ^2 achieved, the laboratories are classified as follows:

$AZ^2 \leq 2.0$	Good
$2.0 < AZ^2 < 3.0$	Satisfactory
$AZ^2 \geq 3.0$	Unsatisfactory

Combined z scores are considered to be of lesser importance than the individual z scores. The EUPT-Panel retains the right not to calculate AZ^2 if it is considered as not being useful or if the number of results reported by any participant is considered to be too low.

In the case of EUPT-SRMs, where only a few results per lab may be available, the Average of the Absolute z scores (AAZ) may be calculated for informative purposes, but only for labs that have reported enough results to obtain 5 or more z scores. For the calculation of the AAZ, z scores higher than 5 will also be classified as 5.

Laboratories within Category B will be ranked according to the total number of pesticides that they correctly reported to be present in the Test Item. The number of acceptable z scores achieved will be presented, too. The EURL-Panel retains the right to calculate combined z scores (see above) also for labs within Category B. e.g. for informative purposes, provided that a minimum number of results (z scores) have been reported.

Publication of results

The EURLs will publish a preliminary report, containing tentative assigned values and z score values for all pesticides present in the Test Item, within 2 months of the deadline for result submission.

The Final EUPT Report will be published after the EUPT-Panel has discussed the results. Taking into account that the EUPT-Panel meets normally only once a year (typically in late summer or autumn) to discuss the results of all EUPTs organised by the EURLs earlier in the year, the final report may be published up to 10 months after the deadline for results submission. Results submitted by non-EU/EFTA laboratories might not always be used in the tables or figures in the final report.

Certificates of participation

Together with the Final EUPT-Report, the EURL Organiser will deliver a Certificate of Participation to each participating laboratory showing the z scores achieved for each individual pesticide, the combined z scores calculated (if any), and the classification into Category A or B.

[16] Formerly named "Sum of squared z scores (SZ^2)"

[17] Laboratory assessment by combined z score values in proficiency tests: experience gained through the EUPT for pesticide residues in fruits and vegetables. Anal. Bioanal. Chem., 2010, 397, 3061–3070.

ANNEX A. Protocols and Target lists of pesticides to be sought.

Feedback
At any time before, during or after the PT participants have the possibility to contact the Organisers and make suggestions or indicate errors. After the distribution of the Final EUPT-Report, participating laboratories will be given the opportunity to give their feedback to the Organisers and make suggestions for future improvements.

Correction of errors
Should errors be discovered in any of the documents issued prior to the EUPT (Calendar, Target Pesticides List, Specific Protocol, General Protocol) the corrected documents will be uploaded onto the website and in the case of substantial errors the participants will be informed. **Before starting the exercise participants should make sure to download the latest version of these documents.**

If substantial errors are discovered in the Preliminary EUPT-Report the Organisers will distribute a new corrected version, where it will be stated that the previous version is no longer valid.

Where substantial errors are discovered in the Final EUPT-Report the EUPT-Panel will decide whether a corrigendum will be issued and how this should look. The online version of the final report will be replaced by the new one and all affected labs will be contacted.

Where errors are discovered in EUPT-Certificates the relevant laboratories will be sent new corrected ones. Where necessary the laboratories will be asked to return the old ones.

Follow-up activities
Laboratories are expected to undertake follow-up activities to trace back the sources of erroneous or strongly deviating results (typically those with $|z| > 2.0$) - including all false positives. Even results within $|z| \leq 2.0$ may have to be checked if there is indications of a significant positive or negative bias.

Upon request, the laboratory's corresponding NRL and EURL are to be informed of the outcome of any investigative activities for false positives, false negatives and for results with $|z| \geq 3.0$. Concerning z scores between 2.0 and 3.0 the communication of the outcome of follow-up activities is optional but highly encouraged where the source of deviation could be identified and could be of interest to other labs.

According to instructions from DG-SANTE, the "Protocol for management of underperformance in comparative testing and/or lack of collaboration of National Reference Laboratories (NRLs) with EU Reference Laboratories (EURLs) activities" is to be followed.

NRLs will be considered as **underperforming in relation to scope** if in at least two of the last four EUPTs falling within their responsibility area if they: a) haven't participated, or b) targeted less than 90% of the compulsory pesticides in the target lists (80% for SRM-compounds), or c) detected less than 90% of the compulsory compounds present in the test items (80% for SRM-compounds). Additionally, NRLs that obtained AZ^2 higher than 3 in two consecutive EUPTs of the last four EUPTs, will be considered as **underperforming in accuracy**. A two-step protocol established by DG-SANTE will be applied as soon as underperformance of an NRL is detected[18]:

Phase 1:
- Identifying the origin of the bad results (failure in EUPTs).
- Actions: On the spot visits and training if necessary and repetition of the comparative test if feasible and close the assessment of results by the EURL.

Phase 2:
- If the results still reveal underperformance the Commission shall be informed officially by the EURL including a report of the main findings and corrective actions.
- The Commission shall inform the Competent Authority and require that appropriate actions are taken.

Underperformance rules for the OfLs will be established at a later stage.

Disclaimer
The EUPT-Panel retains the right to change any parts of this EUPT – General Protocol based on new scientific or technical information. Any changes will be communicated in due course.

[18] Article 101 of the Regulation 625/2017

EUPT-FV21 SPECIFIC PROTOCOL

European Union Proficiency Test for Pesticide Residues in Fruits and Vegetables (2019)

Introduction

This protocol is complementary to the General Protocol of EU Proficiency Tests (EUPT) for Pesticide Residues in Food and Feed (8th Edition). This Proficiency Test is organised by the EURL for Pesticide Residues in Fruits and Vegetables covering Multiresidue Methods (MRM) of analysis.

According to Article 28 of Regulation 396/2005/EC (23rd February, 2005) of the European Parliament and of the Council, all laboratories analysing samples for the official control of pesticide residues shall participate in the European Union Proficiency Tests (EUPTs) for pesticide residues organised by the European Union.

These proficiency tests are carried out in order to improve the quality, accuracy and comparability of the residue data and to evaluate the laboratory capacity to report results that covers the entire range of maximum residue limits (0.005 - 15 mg/kg) in all groups of fruits and vegetable matrices (high water, acid and fat content). Bearing that in mind, a wide concentration range should be covered with the different analytes present in the test item.

Test Item

This proficiency test is based on the analysis of pesticide residues in **red cabbage**. The cabbages were grown in a greenhouse in Almería. The pesticide treatments carried out were pre-harvest using commercial formulations and post-harvest using analytical standards. The test item was frozen (using liquid nitrogen), chopped, homogenised and sub-sampled into polyethylene bottles that had previously been coded.

Ten of these bottles containing the test item were chosen randomly and analysed to check for homogeneity.

The test item is stored frozen (–20ºC) prior to shipment to participants.

Six bottles, again chosen randomly, will be analysed over a period of time to confirm the stability of the pesticides in the test item (three when the test items are shipped, then other three bottles a few days after the deadline for submitting results). There will be one further analysis during this period using three bottles more and reproducing the sample shipment to see if there is any degradation of any of the pesticides present in the test item.

Together with the test item, a blank sample of red cabbage homogenate will be sent to the participants. The blank material should not contain any of the pesticides in the Target Pesticides List, at or above, the specified MRRLs. If a pesticide is identified by the Organisers in the blank material and there is no possibility to find a different blank, that pesticide could be removed from the Target Pesticides List and it will be communicated to all the participants by e-mail.

Amount of Test Item

Participants will receive:

- Approximately 200 g of red cabbage test item treated with pesticides.
- Approximately 200 g of 'blank' red cabbage test item.

Shipment of Test Item

All Test Items will be frozen and packed in polystyrene boxes surrounded in dry ice and packed into cardboard boxes.

The shipment of the test items will be carried out over a one-week period from the 25th February 2019. The Organiser will try to ensure that all the packages arrive on the same day to each laboratory. An information message will be sent out by e-mail before shipment. Laboratories must make their own arrangements for the receipt of the package. They must inform the Organiser of any public holidays in their country/city during the delivery period given in the calendar, as well as making the necessary arrangements for receiving the shipment, even if the laboratory is closed.

The Organisers will not take the responsibility for a parcel if it is retained at customs.

ANNEX A. Protocols and Target lists of pesticides to be sought.

Advice on Test Item Handling
Once received, the test item should be stored deeply frozen (-18ºC or less) prior to analysis thus avoiding any possible deterioration/spoilage. The test item should be mixed thoroughly before taking the analytical portion(s).
All participants should use their own routine standard operating procedures for extraction, clean-up and analytical measurement and their own reference standards for identification and quantification.

Subcontracting
All analytical determinations concerning the test item treatment analysis will be performed in a laboratory which is ISO 17025 accredited, and which has been previously evaluated by the Organisers.

Target List
In addition to the pesticide target list of mandatory compounds, a "voluntary target list" containing pesticides which might be present in the test item will be published. Those voluntary pesticides will not be used for the evaluation of the laboratories into Category A or B, and a separate statistical evaluation will be made for them.

Assigned value and robust relative standard deviation
In order to minimise the influence of out-lying results on the statistical evaluation, the assigned value will be estimated using the robust statistics as described in ANNEX C of ISO 13258:2015, where the robust mean (x*) according algorithm A is defined. For the calculation of the assigned value only results reported by EU and EFTA countries laboratories will be taken into account.
Also, the robust relative standard deviation (CVs*) will be calculated for each analyte.

Laboratory assessment
For the assessment of the overall laboratory performance, the Average of the Squared z-Score (AZ^2) will be used as in the last Proficiency Test, but only for those laboratories in Category A, which will be those laboratories that are able to analyse at least 90% of the pesticides in the target list, that are able to detect at least 90% of the pesticides present in the test material and that report no false positives. Within Category A, the laboratories will be sub-classified as "good", "satisfactory" or "unsatisfactory". All the other laboratories will be classified in Category B. This information will be available in the General Protocol.

Steps to follow
This Proficiency Test will be made up of the following nine essential steps:

1.To participate, each laboratory must complete the Application Form on-line, whose link is available on the EURL-FV Web page, before the deadline stipulated on the Calendar. It is recommended that laboratories download the Target Pesticide List from this web site. Laboratories should carefully read the Target Pesticide List, where the Minimum Required Reporting Limits (MRRLs) are given. The MRRLs do not always correspond with the EU MRLs set for red cabbage.

2.When the registration period is closed, laboratories will receive an e-mail with their user name and password for the restricted area of submission of results.

3.The sample delivery will be **250 euros** for EU/EFTA participants and **350 euros** for participants from other countries. The laboratories will receive an invoice and after that they can start the payment procedure. An e-mail showing the bank transfer confirmation, or similar, may be requested at any time by the Organiser. **Payments without a Laboratory Code identifying them will not be considered as paid.**

4.Any communication with the Organisation should be made using a **Contact Form** placed in the restricted area.

5.**Scope Form** will be placed in the restricted area and will be open to participants from the 11th February – 22nd February 2019, prior to test item shipment. The aim is that laboratories provide information regarding their scope of analysis before receipt of the test item. As default, all compounds of the target lists are selected and the MRRL is listed in the scope. Laboratories will be asked to deselect the compounds they will not include in their PT scope and insert their Reporting

Limits for each pesticide. If a laboratory does not select their scope, the default values will be considered for its evaluation.

6.When the participant laboratories receive the test item (and not before), they must enter the restricted area again and submit the **Test Item Receipt Form** to inform the Organiser that they have accepted the test item. If no test item has been received by 1st March 2019, the laboratories should contact the Organiser using the Contact Form of the restricted area. If the test item receipt form is not filled in, the Organiser will consider that the participant has accepted the test item.

7.Once the laboratory has analysed the test item and is ready to submit their data, they must enter their results at various steps by accessing the restricted area in the EURL–FV web site. The participant laboratories must respect the deadline for submitting their results – 25th March 2019- using the tabs ***Detected, Edit results and Edit Methods*** on-line.
For each pesticide included in the laboratory scope, the Reporting Limit (RL) will be requested. The MRRL and the participant's own RL will be used to help identify and calculate z scores for false negative results. This form will also request information on which of the pesticides sought by the laboratory is within the laboratory's routine scope and whether it is accredited.
The laboratories will be also asked to report any pesticide that may have been detected in the blank test item.
All concentrations must be expressed in mg/kg together with the recovery as a percentage. The actual results/residue levels measured must be reported as numbers. Symbols (>, <, ±, ≥, ≤, …) will not be accepted. **IMPORTANT**: If your result is not correctly expressed it will be considered as 'ND' (Not Detected).
The number of significant figures should be based on the procedures provided in SANTE/11813/2017. Additional significant figures may be recorded for the purpose of statistical analysis.
Results should not be reported where a pesticide was not detected or was detected below the laboratory LOQ. In both cases, this will be recorded as 'ND'. If a pesticide was not sought, it will be recorded as 'NA' (Not Analysed). **If a laboratory fills in the scope form, but it does not report results neither fills in the methods form, all the pesticides will be considered as NA.**
The laboratory will also be asked to report the details of the analytical methods they used. A list including all the pesticides detected in the sample will be shown along with a pesticide reference number. Laboratories may describe a method for the first pesticide and use this pesticide reference number to refer to other pesticides determined using the same method.
When all fields are filled out, laboratories must accept and submit their final results by clicking the check box and then click on Final submission, before 25th March 2019.
I**MPORTANT: After the final submission it will NOT be possible to edit the results.**
Participants will receive an email confirming the submission of their results, and with an attached excel file with their submitted data.
It should **not** be assumed that only pesticides registered for use on red cabbage are present in the test item.

8.One final tab, ***Additional Info,*** will be accessible after the deadline for submission of results has passed. In this Form it will be possible to submit the method information of false negative results. It will be available from 25th March – 1st April 2019. Not all laboratories may need to fill this in. It will depend upon information reported on previous Forms.

9.The Organiser will evaluate the results at the end of the proficiency test, once the deadline for receipt of results has passed. The Organiser will send all the participants the preliminary results, containing all the reported concentrations, in order to make sure that there was not any mistake from the Organisation side. When necessary, the Organiser will ask the participants by e-mail specific details about the methods of analysis used. After a stipulated deadline, the results will be evaluated and a preliminary report containing the preliminary assigned values and z scores will be sent to the participants. Finally, after evaluation by the Scientific Committee, the Final Report will be published online and a copy will be sent to each participant laboratory. This report will include information regarding the design of the test, the homogeneity and stability results, a statistical evaluation of the participant's results as well as graphical displays of the results and any conclusions. Results submitted by non-EU/EFTA laboratories might not always be used in the tables or figures in the final report. Further relevant information considered to be of value may also be included.

ANNEX A. Protocols and Target lists of pesticides to be sought.

Calendar

EUPT-FV21 CALENDAR	
Activity	**Date**
Registration period at www.eupt-registration.eu	20th December 2018 -25th January 2019
Specific Protocol published on the Web site.	11th February 2019 at the latest
Selection of the scope.	11th - 22nd February 2019
Sample distribution.	25th February 2019
Deadline for receiving sample acceptance	4th March 2019
Deadline for receiving results	25th March 2019
Filling in additional information, if necessary.	25th March - 1st April 2019
Preliminary Results: only results, no statistical treatment.	April 2019
Preliminary Report: (containing preliminary assigned values and z scores)	May 2019
Final Report distributed to the Laboratories.	Final Report distributed to the Laboratories.

Cost of test item shipment.
EU/EFTA laboratories will be charged **250 €** for the shipment cost, for **non-EU/EFTA** laboratories the amount will be **350 €**. Regarding payment procedures - each laboratory can specify their details and invoice requests when applying for the test.

Please, do not pay for this EUPT until we send you the invoice.
Remember to include your Laboratory Code in the subject of the bank transfer.

Payment details are as follows:

BANK NAME: CAJAMAR - Caja Rural Sociedad Corporativa de Crédito
BANK ACCOUNT HOLDER: Universidad de Almeria
BANK ADDRESS: Office Number 990. Universidad de Almeria. Spain
ACCOUNT NUMBER: ES0730580130172731005000
SWIFT: CCRIES2A

Contact information
The official organising group details are as follows:
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Quality Control Group
Dr. Antonio Valverde, University of Almería, Spain
Dr. Paula Medina, European Food Safety Authority, Italy.

Advisory Group
Dr. Michelangelo Anastassiades, CVUA, Stuttgart, Germany.
Dr. Miguel Gamón, Laboratorio Agroalimentario, Valencia, Spain.
Dr. Magnus Jezussek, Bavarian Health and Food Safety Authority, Erlangen, Germany.
Dr. André de Kok, NVWA, Wageningen, The Netherlands.
Mr. Ralf Lippold, CVUA, Freiburg, Germany.
Dr. Sonja Masselter, AGES GmbH Institute for Food Safety, Innsbruck, Austria.
Mr. Finbarr O'Regan, Pesticide Control Laboratory, Celbridge, Ireland.
Ms. Patrizia Pelosi, Istituto Superiore di Sanità, Roma, Italy.
Dr. Tuija Pihlström, National Food Agency, Uppsala, Sweden.
Dr. Mette Erecius Poulsen, DTU, Copenhagen, Denmark.

TARGET PESTICIDE LIST FOR THE EUPT-FV-21

Pesticide	MRRL (mg/Kg)
Acephate	0.01
Acetamiprid	0.01
Acrinathrin	0.01
Aldicarb	0.01
Aldicarb Sulfone	0.01
Aldicarb Sulfoxide	0.01
Aldrin	0.005
Amectrotadin	0.01
Azinphos-methyl	0.01
Azoxystrobin	0.01
Benfuracarb	0.01
Bifenthrin (sum of isomers)	0.01
Biphenyl	0.01
Bitertanol (sum of isomers)	0.01
Boscalid	0.01
Bromopropylate	0.01
Bromuconazole (sum of diastereoisomers)	0.01
Bupirimate	0.01
Buprofezin	0.01
Cadusafos	0.005
Carbaryl	0.01
Carbendazim and benomyl (sum of benomyl and carbendazim expressed as carbendazim)	0.01
Carbofuran	0.01
Carbofuran-3-hydroxy	0.01
Carbosulfan	0.01
Chlorantraniliprole	0.01
Chlorfenapyr	0.01
Chlorfenvinphos	0.01
Chlorobenzilate	0.01
Chlorothalonil	0.01
Chlorpropham	0.01
Chlorpyrifos	0.01
Chlorpyrifos-methyl	0.01
Clofentezine	0.01
Clothianidin	0.01
Cyazofamid	0.01
Cyfluthrin (cyfluthrin incl. other mixtures of constituent isomers (sum of isomers))	0.01
Cymoxanil	0.01
Cypermethrin (cypermethrin incl. other mixtures of constituent isomers (sum of isomers))	0.01
Cyproconazole	0.01
Cyprodinil	0.01
Deltamethrin (cis-deltamethrin)	0.01
Demeton-S-methylsulfone	0.005
Diazinon	0.005
Dichlofluanid	0.01
Dichlorvos	0.005
Dicloran	0.01
Dicofol (sum of p, p´ and o,p´ isomers)	0.01
Dieldrin	0.005
Diethofencarb	0.01
Difenoconazole	0.01
Diflubenzuron	0.01
Dimethoate	0.003
Dimethomorph (sum of isomers)	0.01
Dimethylaminosulfotoluidide (DMST)	0.01
Diniconazole (sum of isomers)	0.01
Diphenylamine	0.01
Endosulfan alpha	0.01
Endosulfan beta	0.01
Endosulfan sulfate	0.01
EPN	0.01
Epoxiconazole	0.01
Ethion	0.01

ANNEX A. Protocols and Target lists of pesticides to be sought.

Pesticide	MRRL (mg/Kg)
Ethirimol	0.01
Ethoprophos	0.005
Etofenprox	0.01
Etoxazole	0.01
Famoxadone	0.01
Fenamidone	0.01
Fenamiphos	0.01
Fenamiphos sulfone	0.01
Fenamiphos sulfoxide	0.01
Fenarimol	0.01
Fenazaquin	0.01
Fenbuconazole	0.01
Fenhexamid	0.01
Fenitrothion	0.01
Fenoxycarb	0.01
Fenpropathrin	0.01
Fenpropidin	0.01
Fenpropimorph (sum of isomers)	0.01
Fenpyroximate	0.01
Fenthion	0.01
Fenthion oxon	0.01
Fenthion oxon sulfone	0.01
Fenthion oxon sulfoxide	0.01
Fenthion sulfone	0.01
Fenthion sulfoxide	0.01
Fenvalerate (any ratio of constituent isomers (RR, SS, RS & SR) including esfenvalerate)	0.01
Fipronil	0.004
Fipronil sulfone	0.004
Flonicamid	0.01
Flubendiamide	0.01
Fludioxonil	0.01
Flufenoxuron	0.01
Fluopicolide	0.01
Fluopyram	0.01
Fluquinconazole	0.01
Flusilazole	0.01
Flutolanil	0.01
Flutriafol	0.01
Fluxapyroxad	0.01
Formetanate (expressed as formetanate (hydrochloride))	0.01
Fosthiazate	0.01
Hexaconazole	0.01
Hexythiazox	0.01
Imazalil	0.01
Imidacloprid	0.01
Indoxacarb (sum of indoxacarb and its R enantiomer)	0.01
Iprodione	0.01
Iprovalicarb	0.01
Isocarbophos	0.01
Isofenphos-methyl	0.01
Isoprothiolane	0.01
Kresoxim-methyl	0.01
Lambda-Cyhalothrin	0.01
Linuron	0.01
Lufenuron (any proportion of constituent isomers)	0.01
Malaoxon	0.01
Malathion	0.01
Mandipropamid	0.01
Mepanipyrim	0.01
Metaflumizone (sum of E- and Z- isomers)	0.01
Metalaxyl and metalaxyl-M	0.01
Methamidophos	0.01
Methidathion	0.01
Methiocarb	0.01
Methiocarb sulfone	0.01

Pesticide	MRRL (mg/Kg)
Methiocarb sulfoxide	0.01
Methomyl	0.01
Methoxyfenozide	0.01
Metrafenone	0.01
Monocrotophos	0.01
Myclobutanyl	0.01
Omethoate	0.003
Orthophenylphenol	0.01
Oxadixyl	0.01
Oxamyl	0.01
Oxydemeton-methyl	0.01
Paclobutrazole	0.01
Paraoxon-methyl	0.01
Parathion-ethyl	0.01
Parathion-methyl	0.01
Penconazole	0.01
Pencycuron	0.01
Pendimethalin	0.01
Permethrin (sum of isomers)	0.01
Phenthoate	0.01
Phosalone	0.01
Phosmet	0.01
Phosmet oxon	0.01
Phoxim	0.01
Pirimicarb	0.01
Pirimicarb-desmethyl	0.01
Pirimiphos-methyl	0.01
Prochloraz (only parent compound)	0.01
Procymidone	0.01
Profenofos	0.01
Propamocarb (only parent compound)	0.01
Propargite	0.01
Propiconazole (sum of isomers)	0.01
Propyzamide	0.01
Prosulfocarb	0.01
Prothioconazole (Prothioconazole-desthio) (sum of isomers)	0.01
Prothiofos	0.01
Pyraclostrobin	0.01
Pyridaben	0.01
Pyrimethanil	0.01
Pyriproxyfen	0.01
Quinoxyfen	0.01
Spinosad (sum of spinosyn A and spinosyn D, expr. as spinosad)	0.01
Spirodiclofen	0.01
Spiromesifen	0.01
Spirotetramat	0.01
Spirotetramat metabolite BYI08330-enol	0.01
Spirotetramat metabolite BYI08330-ketohydroxy	0.01
Spirotetramat metabolite BYI08330-monohydroxy	0.01
Spirotetramat metabolite BYI08330 enol-glucoside	0.01
Spiroxamine (sum of isomers)	0.01
Tau-Fluvalinate	0.01
Tebuconazole	0.01
Tebufenozide	0.01
Tebufenpyrad	0.01
Teflubenzuron	0.01
Tefluthrin	0.01
Terbuthylazine	0.01
Tetraconazole	0.01
Tetradifon	0.01
Thiabendazole	0.01
Thiacloprid	0.01
Thiamethoxam	0.01
Thiodicarb	0.01
Thiophanate-methyl	0.01

ANNEX A. Protocols and Target lists of pesticides to be sought.

Pesticide	MRRL (mg/Kg)
Tolclofos-methyl	0.01
Tolylfluanid	0.01
Triadimefon	0.01
Triadimenol (any proportion of constituent isomers)	0.01
Triazophos	0.01
Trichlorfon	0.01
Trifloxystrobin	0.01
Triflumuron	0.01
Trifluralin	0.01
Triticonazole	0.01
Vinclozolin (only parent compound)	0.01
Zoxamide	0.01

In bold: new pesticides this year

This list is based on Commission Implementing Regulation (EU) 2018/555 of 9 April 2018
The MRRLs are based on Regulation (EC) No. 396/2005 and Commission Directive 2006/125/EC.

VOLUNTARY PESTICIDE LIST FOR THE EUPT-FV-21

Pesticide	MRRL (mg/Kg)
Benalaxyl including other mixtures of constituent isomers including benalaxyl-M (sum of isomers)	0.01
Benzovindiflupyr	0.01
Chlorfluazurone	0.01
Clomazone	0.01
Cyflufenamid	0.01
Fenpyrazamine	0.01
Flufenacet (only parent compound)	0.01
Heptachlor	0.01
Heptachlor epoxide	0.01
Isoxaflutole	0.01
Isoxaflutole diketonitrile degradate	0.01
Isopyrazam	0.01
Metconazole (sum of isomers)	0.01
Molinate	0.01
Novaluron	0.01
Penflufen	0.01
Penthiopyrad	0.01
Picolinafen	0.01
Propaquizafop	0.01
Pyrethrins	0.01
Quintozene	0.01
Pentachloro-aniline	0.01
Proquinazid	0.01
Pyridalil	0.01
Pyriofenone	0.01
Quinoclamine	0.01
Rotenone	0.01
Spinetoram	0.01
Sulfoxaflor (sum of isomers)	0.01
Tetramethrin	0.01
Tricyclazole	0.01
Tritosulfuron	0.01

In bold: new pesticides this year

This list is based on the working document SANCO/12745/2013 of 21–22 November 2017 rev. 9(1)

ANNEX B. List of laboratories that agreed to participate in EUPT-FV21

COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Austria	AGES Innsbruck - Institute for Food Safety	Innsbruck	Yes
Belgium	LOVAP	Geel	Yes
Belgium	PRIMORIS (Phytolab) - Belgium	Gent - Zwijnaarde	Yes
Belgium	Sciensano - Pesticide Lab	Brussels	Yes
Bulgaria	CLCTC - Sofia | Pesticide Lab	Sofia	Yes
Bulgaria	Euro Lab Kapitan Andreevo (border check point)	Svilengrad	Yes
Bulgaria	Primoris - Bulgaria, Plovdiv	Plovdiv	Yes
China	Agro-Environmental Quality Supervision & Testing Center, Ministry of Agriculture and Rural Affairs, Tianjin	Tianjin	Yes
China	Agro-product Safety Center, Chinese Academy of Inspection & Quarantine	Beijing	Yes
China	Beijing Uni-star Inspection Technology Co., Ltd.	Beijing	Yes
China	Inspection and Quarantine Technique Center of Fujian Entry-Exit Inspection and Quarantine Bureau	Fuzhou, Fujian	Yes
China	SCDC - Pesticide Lab (Shanghai)	Shanghai	Yes
Colombia	Laboratorio Nacional de Insumos Agrícolas-LANIA / Instituto Colombiano Agropecuario ICA	Mosquera, Cundinamarca	Yes
Costa Rica	Pesticide Lab (San José)	San Jose	Yes
Croatia	Bioinstitut d.o.o.	Cakovec	Yes
Croatia	Center for Food Control - PBF, Zagreb	Zagreb	Yes
Croatia	Croatiakontrola - Pesticide Lab	Zagreb	Yes
Croatia	Croatian National Institute of Public Health-HZJZ	Zagreb	Yes
Croatia	Dr. Andrija Štampar - Pesticide Lab	Zagreb	Yes
Croatia	INSPECTO d.o.o. Laboratorij (Osijek)	Osijek	Yes
Croatia	Primorsko-goranska County, Rijeka - Pesticide Lab	Rijeka	Yes
Croatia	Sample Control - Pesticide Lab	Lučko	Yes
Cyprus	Pesticide Residues Lab of S.G.L	Nicosia	Yes
Czech Republic	Central Institute for Supervising and Testing in Agriculture	Brno	Yes
Czech Republic	Czech Agriculture and Food Inspection Authority	Praha	Yes
Czech Republic	VSCHT (Praha) - Pesticide Lab	Praha 6	Yes
Denmark	DTU National Food Institute	Lyngby	Yes

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COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Denmark	Laboratoriet Ringsted - Pesticide Lab	ringsted	Yes
Estonia	Laboratory for Residues and Contaminants, Agricultural Research Centre, Estonia	Saku	Yes
Estonia	Pesticide Lab (Tartu)	Tartu	Yes
Finland	Finnish Customs Laboratory	Espoo	Yes
Finland	Finnish Food Authority	Helsinki	Yes
Finland	MetropoliLab Oy	Helsinki	Yes
France	CAPINOV (Landerneau)	Landerneau Cedex	Yes
France	Centre d'Analyses Méditerranée Pyrénées	Perpignan	Yes
France	CERECO (GARONS)	GARONS	Yes
France	INOVALYS - Le Mans	LE MANS	Yes
France	Laboratoire GIRPA	BEAUCOUZE	Yes
France	Phytocontrol (Nimes) - Pesticide Lab	NIMES	Yes
France	SCL IDF	MASSY Cedex	Yes
France	SCL Laboratoire de Montpellier	MONTPELLIER	Yes
Germany	Amt für Verbraucherschutz - PSM (Düsseldorf)	Duesseldorf	Yes
Germany	Analytica Alimentaria GmbH	Kleinmachnow	Yes
Germany	Bayerisches Landesamt für Gesundheit und Lebensmittelsicherheit	Erlangen	Yes
Germany	Bundeswehr - Pesticide Lab (Garching-Hochbrück)	Garching-Hochbrück	Yes
Germany	Chemisches Labor Dr. Mang	Frankfurt am Main	Yes
Germany	CVUA RRW - Pesticide Lab (Krefeld)	Krefeld	Yes
Germany	CVUA Stuttgart Pesticide Lab	Fellbach	Yes
Germany	CVUA-MEL - Pesticide Lab (Münster)	Muenster	Yes
Germany	Eurofins - Germany, Hamburg, Großmoorbogen	Hamburg	Yes
Germany	Federal Office of Consumer Protection and Food Safety, NRL for Pesticide Residues	Berlin	Yes
Germany	GALAB Laboratories GmbH - Hamburg	Hamburg	Yes
Germany	ILAU GmbH - Pesticide Lab	Anzing	Yes
Germany	Institut für Hygiene und Umwelt	Hamburg	Yes
Germany	Kwalis Qualitätsforschung Fulda GmbH	Dipperz	Yes
Germany	Labor Dr. Lippert GmbH	Sinzig	Yes

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COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Germany	Labor Friedle - Germany, Tegernheim	Tegernheim	Yes
Germany	LALLF - Pesticide Lab (Rostock)	Rostock	Yes
Germany	Landesamt für Verbraucherschutz ST FB 3	Halle/Saale	Yes
Germany	Landeslabor Berlin-Brandenburg	Frankfurt (Oder)	Yes
Germany	Landeslabor Schleswig-Holstein	Neumünster	Yes
Germany	Landesuntersuchungsamt für Chemie, Hygiene und Veterinärmedizin Bremen	Bremen	Yes
Germany	LHL - Pesticide Lab (Kassel)	Kassel	Yes
Germany	LTZ Augustenberg	Karlsruhe	Yes
Germany	LUA Rheinland-Pfalz, Institut für LM-Chemie Speyer	Speyer	Yes
Germany	LUA Saarland - Pesticide Lab	Saarbrücken	Yes
Germany	LUA Sachsen	Dresden	Yes
Germany	LUFA Kiel - Pesticide Lab	Kiel	Yes
Germany	Niedersächsisches Landesamt für Verbraucherschutz und Lebensmittelsicherheit, Lebensmittel- und Veterinärinstitut Oldenburg	Oldenburg	Yes
Germany	Thüringer Landesamt für Verbraucherschutz	Bad Langensalza	Yes
Germany	WESSLING GmbH	Berlin	Yes
Germany	ZInstSanBw Kiel - Pesticide Lab	Kronshagen	Yes
Greece	AGROLAB-RDS	Thessaloniki, Sindos	Yes
Greece	Benaki Phytopathological Institute, Kifissia	KIFISSIA	Yes
Greece	Pesticide Residues Laboratory General Chemical State Laboratory	Athens	Yes
Greece	REGIONAL CENTER OF PLANT PROTECTION QUALITY & PHYTOSANITARY CONTROL	THESSALONIKI	Yes
Hungary	Food Chain Safety Centre Non-profit Ltd. Pesticide Residue Analytical Laboratory, Hódmezővásárhely	Hodmezovasarhely	Yes
Hungary	Food Chain Safety Centre Non-profit Ltd., Pesticide Residue Analytical Laboratory, Szolnok	Szolnok	Yes
Hungary	NFCSO - Pesticide Lab (Velence)	Velence	Yes
Hungary	NFCSO Pesticide Lab (Miskolc)	Miskolc	Yes
Iceland	Matís ohf. / Icelandic Food and Biotech R&D	Reykjavík	Yes
Ireland	Pesticide Control Laboratory	Celbridge	Yes
Italy	Agro.Bio Lab - Italy	Rutigliano	Yes

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COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Italy	APPA Bolzano	Bolzano	Yes
Italy	APPA-Puglia | Polo Alimenti Bari - Pesticide Lab	Bari	Yes
Italy	APPA-SL Trento - Pesticide Lab	Trento	Yes
Italy	ARPA FVG - Pesticide Lab (Udine)	Udine	Yes
Italy	ARPA Lazio (sez. Latina) - Pesticide Lab	Roma	Yes
Italy	ARPA MARCHE- DIP. MACERATA	MACERATA	Yes
Italy	ARPA VDA - Pesticide Lab	Saint-Christophe	Yes
Italy	ARPA Veneto (Laboratorio di Verona)	Verona	Yes
Italy	ARPAC - Pesticide Lab	Naples	Yes
Italy	ARPA-ER - Pesticide Lab	Ferrara	Yes
Italy	ARPAL Sez. di La Spezia	La Spezia	Yes
Italy	ATS Milano - Laboratorio di Prevenzione	Milano	Yes
Italy	ISS - Pesticide Lab	ROMA	Yes
Italy	ISTITUTO ZOOPROFILATTICO SPERIMENTALE LOMBARDIA EMILIA ROMAGNA	Brescia	Yes
Italy	IZS LT - Pesticide Lab	Roma	Yes
Italy	IZS PB - Pesticide Lab	FOGGIA	Yes
Italy	IZS Sardegna - Pesticide Lab	Sassari	Yes
Italy	IZS Sicilia - Pesticide Lab	Palermo	Yes
Italy	IZSAM - Pesticide Lab	Teramo	Yes
Italy	IZSLT Sezione di Firenze	Firenze	Yes
Italy	IZSUM - Italy, Perugia	Perugia	Yes
Italy	Laboratorio Chimico - S.C. CUNEO	Cuneo	Yes
Italy	Laboratorio di Prevenzione (Bergamo)	Bergamo	Yes
Italy	USL Toscana centro - Laboratorio Sanità Pubblica Firenze	FIRENZE	Yes
Kenya	KEPHIS - Pesticide Lab (Nairobi)	Nairobi	Yes
Latvia	BIOR (Riga) - Pesticide Lab	Riga	Yes
Lithuania	NMVRVI - Pesticide Lab (Vilnius)	VILNIUS	Yes
Luxembourg	LNS Food lab	Dudelange	Yes
Norway	NIBIO, Department of Pesticides and Natural Products Chemistry	Aas	Yes

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COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Peru	Bureau Veritas - Lab Lima	Chorrillos Lima	Yes
Poland	InHort (Skierniewice) - Pesticide Lab	Skierniewice	Yes
Poland	IPP-NRI - Pesticide Lab (Poznan)	60-318	Yes
Poland	IPP-NRI - Pesticide Lab (Sosnicowice)	Sosnicowice	Yes
Poland	Laboratorium Fertico	Grójec	Yes
Poland	Laboratory of Food & Feed Safety in Bialystok	Bialystok	Yes
Poland	PIORIN - Central Laboratory (Torun)	Torun	Yes
Poland	sgs - Poland, Pszczyna	Pszczyna	Yes
Poland	UO-Technologia Laboratorium Grójec	Grójec	Yes
Poland	VSES Lodz - Pesticide Lab	Łódź (Lodz)	Yes
Poland	VSES Opole - Pesticide Lab	Opole	Yes
Poland	VSES Warszawa - Pesticide Lab	Warsaw	Yes
Poland	Wojewódzka Stacja Sanitarno-Epidemiologiczna we Wrocławiu - Dział Laboratoryjny	Wroclaw	Yes
Portugal	INIAV - Pesticide Lab	Vairão- Vila do Conde	Yes
Portugal	Labiagro – Laboratório Químico	Oeiras	Yes
Portugal	Laboratório Regional de Veterinária e Segurança Alimentar	Funchal	Yes
Romania	Central Laboratory for Pesticides Residues Control in Plants and Vegetable Products - Bucharest	Bucuresti, Sect.1	Yes
Romania	DSVSA OLT - Lab	Slatina	Yes
Romania	Laboratorul de Reziduuri, DSVSA Ialomita	Slobozia	Yes
Romania	LRCRPPPV Mures	Targu Mures	Yes
Romania	Sanitary Veterinary and Food Safety Directorate	Bucharest	Yes
Saudi Arabia	Laboratory of Monitoring Food Contaminants	Riyadh	Yes
Serbia	Center for Food Analysis (Belgrade)	Belgrade	Yes
Serbia	Institute of Public Health of Belgrade	Belgrade	Yes
Serbia	SP Laboratorija - Pesticide Lab	BECEJ	Yes
Singapore	Singapore Food Agency	Singapore	Yes
Slovakia	Veterinary and Food Institute in Bratislava	Bratislava	Yes
Slovenija	NLZOH-Maribor (location Ljubljana)	LJUBLJANA	Yes

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COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Slovenija	Pesticide Lab - Maribor	Maribor	Yes
Spain	Agricultural and Phytopathological Lab. of Galicia	Abegondo. A Coruña	Yes
Spain	AINIA	Paterna	Yes
Spain	Analytica Alimentaria	Almeria	Yes
Spain	CNTA	SAN ADRIAN (NAVARRA)	Yes
Spain	EUROFINS ECOSUR - Pesticide Lab	LORQUI - MURCIA	Yes
Spain	Eurofins SiCA AgriQ S.L.U.	Vicar	Yes
Spain	Indicate on the invoice the European reference laboratory organizer, as well as the name of the corresponding Proficiency Test	BADAJOZ	Yes
Spain	INSTITUTO TECNOLÓGICO DE CANARIAS, S. A.-LABORATORIO DE RESIDUOS-DEPARTAMENTO DE ANÁLISIS AMBIENTAL	AGÜIMES, GRAN CANARIA	Yes
Spain	Laboratori Agència Salut Pública Barcelona	Barcelona	Yes
Spain	Laboratori Agroalimentari	CABRILS	Yes
Spain	LABORATORIO AGRARIO REGIONAL	Burgos	Yes
Spain	Laboratorio Agroalimentario - Spain, Valencia	Burjassot (Valencia)	Yes
Spain	Laboratorio Agroalimentario de Extremadura	CÁCERES	Yes
Spain	Laboratorio Agroalimentario de Granada	ATARFE (GRANADA)	Yes
Spain	Laboratorio Agroalimentario y de Sanidad Animal	EL PALMAR (MURCIA)	Yes
Spain	Laboratorio Agroambiental de Zaragoza	Zaragoza	Yes
Spain	LABORATORIO ANALÍTICO BIOCLÍNICO SLU	Almeria	Yes
Spain	Laboratorio Arbitral Agroalimentario	MADRID	Yes
Spain	Laboratorio de Producción y Sanidad Vegetal (Jaén)	Mengibar (Jaen)	Yes
Spain	Laboratorio de Salud Pública de Cuenca	CUENCA	Yes
Spain	Laboratorio de Salud Pública de Galicia, Lugo	LUGO	No
Spain	Laboratorio del SOIVRE -Spain, Almeria	Almería	Yes
Spain	LABORATORIO KUDAM, S.L.	PILAR DE LA HORADADA (ALICANTE)	Yes
Spain	Laboratorio Regional Agroalimentario y Ambiental de Castilla la Mancha	Toledo	Yes
Spain	Laboratorio Regional de la CCAA de La Rioja	Logroño	Yes
Spain	Laboratorio SOIVRE en Santa Cruz de Tenerife	Santa Cruz de Tenerife	Yes

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COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Spain	Labratorio de Producción y Sanidad Vegetal de Almería Agencia de Gestión Agraria y Pesquera de Andalucia (Junta de Andalucia)	La Mojonera (Almería)	Yes
Spain	Labs & Technological Services, AGQ	Burguillos	Yes
Spain	NASERTIC	Villava	Yes
Spain	National Centre for Food (Majadahonda)	Majadahonda-Madrid	Yes
Spain	SALUD PUBLICA (Almería) - Pesticide Lab	ALMERIA	Yes
Spain	SALUD PUBLICA (LSP - MADRID SALUD)	Madrid	Yes
Spain	Soivre Valencia - Pesticide Lab	VALENCIA	Yes
Sweden	Eurofins Food & Feed Testing Sweden AB	Lidköping	Yes
Sweden	Swedish National Food Agency	Uppsala	Yes
Switzerland	Kantonales Labor Zürich	Zürich	Yes
Switzerland	Kantonales Laboratorium Bern	Bern	Yes
Switzerland	Pesticide Lab (Aargau)	Aarau	Yes
Switzerland	Service de la consommation et des affaires vétérinaires de Genève	Genève	Yes
Thailand	Central Laboratory - Pesticide Lab (Bangkok)	Bangkok	Yes
The Netherlands	Eurofins Lab Zeeuws-Vlaanderen B.V. - Pesticiden	Graauw	Yes
The Netherlands	Groen Agro Control	Delfgauw	Yes
The Netherlands	NVWA - NRL for Pesticides	Wageningen	Yes
Turkey	SGS - Food Control Laboratory (Mersin)	Mersin	Yes
United Kingdom	Concept Life Sciences	Bar Hill	Yes
United Kingdom	Eurofins Food Testing UK	Wolverhampton	Yes
United Kingdom	Fera Science Ltd	York	Yes
United Kingdom	SASA	Edinburgh	Yes
Uruguay	Pharmacognosy& Nat. Prod. GACT Facutlad de Quimica UdelaR, Uruguay	Montevideo	Yes