EUROPEAN UNION PROFICIENCY TEST FOR PESTICIDES IN FRUIT AND VEGETABLES.

SCREENING METHODS 09

(EUPT-FV-SM09)

Pesticide Residues in Lemon Homogenate

Final Report

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CONTENT

EUROPEAN UNION PROFICIENCY TEST FOR PESTICIDES IN FRUIT AND VEGETABLES. SCREENING METHODS 09

BACKGROUND

According to Article 28 of Regulation 396/2005/EC of the European Parliament and European Council regarding 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, facilitated by the Commission. These proficiency tests are carried out on an annual basis in order to ensure the quality, accuracy and comparability of the residue data reported by EU Member States to the European Commission, as well as by other Member States within the framework of coordinated national monitoring and surveillance programmes.

Regulation (EU) No 628/2017[2] lays down the responsabilities and tasks, of European Union Reference Laboratories (EURLs) for Food, Feed and Animal Health. Among these tasks is the provision for regular inter-laboratory comparative testing or proficiency tests. This is the nineth time that the EURL for pesticides in fruit and vegetables at the University of Almería, Spain, has organised a proficiency test on qualitative screening methods for pesticides in fruits and vegetable commodities.

The aim of these tests is to evaluate laboratory capability when using wide-scope qualitative and/or semi-quantitative screening methods during routine analysis, for detecting and identifying unexpected pesticides at levels at, or above 0.01 mg/kg – included in and/or in addition to the laboratories' quantitative methods used for frequently-detected pesticides. A second aim is to encourage official laboratories (OfLs) to extend the scope of their methods in a cost-effective way, by using the different mass spectrometry (MS) instruments/software and methods available (whether they are old or new).

Participation in this PT remains on a voluntary basis. Besides this one, official laboratories have a significant number of mandatory PTs annually, given that the EURL-FV already organises the PT for quantitative multi-residue pesticide analysis (EUPT-FV19) over the same time period. Nevertheless, all FV-National Reference Laboratories (FV-NRLs) and FV-Official Laboratories (FV-OfLs) involved in the determination of pesticide residues in fruit and vegetables for the EU-coordinated monitoring programme, or for their own national programmes, were invited to take part.

DG-SANTE will have full access to all EUPT data including the individual lab-codes/lab-name keys. This report may be presented to the Phytopharmaceuticals – Pesticides Residues section of the Plants, Animals, Food and Feed Committee.

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

[2]Regulation (EU) No 625/2017 of 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 L95/1 of 07/04/2017

1. INTRODUCTION

The EURL-FV has decided to continue its operation in these screening proficiency tests because of the good acceptance in the EURL-FV laboratory network.

Mass Spectrometry plays an essential role in the everyday work carried out by laboratories. Technological improvements in modern MS systems offer new possibilities for greatly increasing the scope of MRM (multiresidue methods) analysis. Whereas full-scan measurements are theoretically the best approach for MS screening, developments in targeted measurements also offer the potential for a substantially increased scope of analysis. Another reason for conducting this proficiency test on screening methods is to gather information from laboratories as to the type of software they use for processing data: whether laboratories are using commercial software and databases or whether they are internally constructed and search manually. This type of test provides an overview of such information as well as valuable insight into the possible need for further software development in the near future.

The aim of the EURL-FV is for laboratories to be able to use mass-spectrometry-based screening methods routinely, following validation. This is in line with Document N° SANTE/11945/2015 Guidance document on analytical quality control and method validation procedures for pesticides residue analysis in food and feed.

This EUPT-FV-SM09 is aimed at all NRLs and all OfLs for fruits and vegetables in EU Member States. Laboratories outside this EURL/NRL/OfL-Network were also invited to participate.

The evaluation of this PT was based on qualitative information, although an estimated concentration was requested for those pesticides that were detected, only for informative purposes. It was decided, as in previous PTs, not to provide the laboratories with a Target Pesticide List so that their capability in detecting whatever pesticides were present was also evaluated.

2. TEST ITEMS

2.1 Preparation of the treated test item.

This proficiency test is based on the pesticide-residue analysis of lemon. The lemon trees were organically cultivated in a farm in Almería, Spain.

The pesticides used to spike the lemon were decided upon by the Quality Control Group. No target pesticide list was provided to participants. The pesticides selected for treating the test item for this EUPT-FV-SM09 were mainly chosen taking into account the following considerations:

- That they were not included in the EU-Coordinated Multiannual Control Programme of the Union for 2017, 2018 and 2019 (Regulation (EU) 2016/662).
- That they had particularly acute toxicity and/or had low ARfD values.

Table 2.1 shows the 14 pesticides present in the lemon sample. The pesticide treatments were carried out post-harvest using standard solutions. The test item was frozen (using liquid nitrogen) and chopped. The frozen minced lemon was mixed in a constantly-spinning container until a homogeneous item was obtained. Finally, 200 g portions of the well-mixed homogeneate were weighed out into screw-capped polyethylene plastic bottles, sealed and stored in a freezer at about -20 °C prior to distribution to participants.

Table 2.1 Pesticides present in the sample.

Pesticides			
Bromuconazole	Cyflufenamid	Dieldrin	Fenpyrazamine
Fipronil	Flubendiamide	Isopyrazam	Novaluron
Orthosufamuron	Penthiopyrad	Pyridalid	Spinetoram
	Tricyclazole	Valifenalate	

2.2 Preparation of "blank" test item.

The lemon used for the production of the blank item was organically grown in the same field as the test item. A homogenate was prepared in the same way as the treated test item described previously.

2.3 Homogeneity and stability tests.

Homogeneity and stability tests associated with 'quantitative' PTs were conducted by the Organisers with a further acceptance criterion to those in the classical EUPT-FVs. The PT test item was analysed in order to identify the present pesticides, which were consistently confirmed to be above 0.01 mg/kg.

To confirm the homogeneity of the test item sent, ten test samples were randomly chosen from those stored in the freezer and analysed in duplicate so as to check for the presence of the pesticides.

The injection sequence of the 20 analyses by GC and LC was determined from a table of randomly-generated numbers. The statistical evaluation was performed according to the International Harmonized Protocol published by IUPAC, ISO and AOAC[3]. The results of the homogeneity tests are given in Table 2.3a. 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

[3] ISO 13528:2015, Statistical methods for use in proficiency testing by interlaboratory comparison, International Organization for Standardization

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 the analytical sampling mean for all the pesticides. This was used to demonstrate that the between-bottle variance was not higher than the within-bottle variance.

Table 2.3a shows the results of these tests, together with the average concentration values for each of the pesticides used to treat the sample.

Table 2.3a Homogeneity tests

Test item No.	018 A	018 B	048 A	048 B	068 A	068 B	083 A	083 B	096 A	096 B	096 A	113 B	126 A	126 B	132 A	132 B	162 A	162 B	1165 A	162 B	A. Cc (mg/kg)	$Ss^2 < c$ Pass/Fail
Bromuconazole	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.014	Pass
Cyflufenamid	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.031	Pass
Dieldrin	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.019	Pass
Fenpyrazamine	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.028	Pass
Fipronil	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.021	Pass
Flubendiamide	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.034	Pass
Isopyrazam	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.025	Pass
Novaluron	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.031	Pass
Orthosulfamuron	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.027	Pass
Penthiopyrad	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.021	Pass
Pyridalil	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.022	Pass
Spinetoram	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.018	Pass
Tricyclazole	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.015	Pass
Valifenalate	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	0.019	Pass

I: Identified A. Cc: Average Concentration

Nine bottles, again chosen randomly, were analysed by duplicate over a period of time to confirm the stability of the pesticides in the test item. Three when the test items were shipped, three after 48 hours reproducing the sample shipment conditions and then, other three bottles a few days after the deadline for submitting results to see if there was any degradation of any of the pesticides present in the test item. The results are given in table 2.3b.

Table 2.3b Stability tests performed.

Date	Shipment Day (13th February 2017)			48h later Shipment Day (15th February 2017)			Few days after deadline (3rd March 2017)		
Test item No.	019	084	131	039	100	154	014	074	139
Bromuconazole	I	I	I	I	I	I	I	I	I
Cyflufenamid	I	I	I	I	I	I	I	I	I
Dieldrin	I	I	I	I	I	I	I	I	I
Fenpyrazamine	I	I	I	I	I	I	I	I	I
Fipronil	I	I	I	I	I	I	I	I	I
Flubendiamide	I	I	I	I	I	I	I	I	I
Isopyrazam	I	I	I	I	I	I	I	I	I
Novaluron	I	I	I	I	I	I	I	I	I
Orthosulfamuron	I	I	I	I	I	I	I	I	I
Penthiopyrad	I	I	I	I	I	I	I	I	I
Pyridalil	I	I	I	I	I	I	I	I	I
Spinetoram	I	I	I	I	I	I	I	I	I
Tricyclazole	I	I	I	I	I	I	I	I	I
Valifenalate	I	I	I	I	I	I	I	I	I

I: Identified NI: Not identified

2.4 Distribution of test items and protocol to participants

Approximately 200 g of treated lemon homogenate together with another 200 g of 'blank' lemon homogenate were shipped to participants on 13th February 2017. The deadline for results submission to the Organiser was 72 hours after receipt of the test item. Participants were asked to report all the pesticides that they detected.

Laboratories were asked to screen the test items using the wide-scope screening methods they would normally apply, or anticipate applying, for official monitoring purposes. This typically involves full-scan techniques like GC-MS (single quadrupole, ion trap, ToF) and/or LC-MS (ToF and Orbitrap). However, extended targeted methods using LC-MS/MS (triple quadrupole, Q-trap, Q-ToF) or GC-MS/MS (triple quadrupole, ion trap, Q-trap, Q-ToF) could also be used.

Before shipment, the laboratories received full instructions for the receipt and analysis of the test item and they were encouraged to use their own screening methods. These instructions, laid out as the General and Specific Protocols, were uploaded onto the EUPT-FV-SM09 web page, designed especially for this Proficiency Test. This information was also sent by e-mail to all participant laboratories. The Application Form was uploaded onto this same web site together with the Sample Receipt and the results forms. These allowed the evaluation of the mass-spectrometric screening methods that each of the participants used.

3. STATISTICAL METHODS

3.1 Type of results reported

The evaluation of this PT was based on qualitative information, although an estimated concentration was requested for those pesticides that were detected, only for informative purposes.

The robust mean of the estimated concentrations reported was calculated using robust statistics as described in ISO 13528:2015, taking into account the results reported by EU and EFTA countries laboratories only.

3.1.1 Other Reported Pesticides

These were considered as those results showing the apparent presence of pesticides which were: (i) not used in the test item treatment, or (ii) not identified by the Organiser, even after repeated analyses. However, if a number of participants detect the same additional pesticide(s), then a decision as to whether, or not, this should be considered an 'Other Reported Pesticide' result was made on a case-by-case basis.

> *Organiser's Note: Not all screening methods immediately provide sufficient information to allow full identification. In such cases, when they detect a pesticide in real life, laboratories normally do a follow-up confirmatory analysis: using, for example, LC-MS/MS.*

3.1.2 Non-Reported Pesticides

These were considered as any pesticide present in the sample but not reported by the lab even though the Organiser had confirmed it as present in the test item above 0.010 mg/kg.

4. RESULTS

4.1 Summary of reported results

Eighty-three laboratories agreed to participate in this ninth proficiency test on screening methods. Seventy-five laboratories submitted results on time (eigth laboratories cancelled their participation). All results reported by the participants are given in Appendix 1. Graphical representations of the results reported are shown in Appendix 2. Details of the screening methods used are provided in Appendix 3 (available on the EUPT-FV-SM09 webpage, not in the printed version). The laboratories that agreed to participate are listed in Annex 1.

A summary of the results reported by pesticide can be seen in Table 4.1a.

Table 4.1a Summary of Reported Results.

Pesticide	Reported		Not Reported	
	No. of laboratories	% of laboratories *	No. of laboratories	% of laboratories *
Bromuconazole	64	85	11	15
Cyflufenamid	61	81	14	19
Dieldrin	64	85	11	15
Fenpyrazamine	40	53	35	47
Fipronil	71	95	4	5
Flubendiamide	55	73	20	27
Isopyrazam	47	63	28	37
Novaluron	53	71	22	29
Orthosulfamuron	11	15	64	85
Penthiopyrad	40	53	35	47
Pyridalil	45	60	30	40
Spinetoram	47	63	28	37
Tricyclazole	58	77	17	23
Valifenalate	30	40	45	60

* The % of laboratories is calculated based on the total number of laboratories submitting results (75 laboratories).

In this EUPT-FV-SM09 the estimated concentration was requested for those pesticides that were detected, only for informative purposes. However, not all the laboratories reported concentration results (Appendix 1 – Estimated Concentrations Reported). Table 4.1b shows the robust mean of the estimated concentrations reported, the average concentrarion from the homogeneity test and the dispersion of the concentration results reported.

Table 4.1b Robust mean values and CVs (%) for all pesticides evaluated.

Pesticide	Robust mean of estimated concentrations reported (mg/kg)	Average concentration Homogeneity test (mg/kg)	CV (%)
Bromuconazole	0.014	0.014	30.7
Cyflufenamid	0.027	0.031	18.7
Dieldrin	0.017	0.019	27.4
Fenpyrazamine	0.025	0.028	19.7
Fipronil	0.018	0.021	35.5
Flubendiamide	0.030	0.034	24.9
Isopyrazam	0.021	0.025	16.2
Novaluron	0.028	0.031	39.4
Orthosulfamuron*	Not Calculated	Not Calculated	Not Calculated
Penthiopyrad	0.018	0,021	17.1
Pyridalil	0.026	0.022	27.2
Spinetoram	0.013	0.018	29.8
Tricyclazole	0.017	0.015	23.8
Valifenalate	0.016	0.019	37.7

*These results haven't been calculated because of the low number of concentration results reported.

No other compounds were identified and quantified by the organizer at concentrations above 0.010 mg/kg.

4.1.1 Other Reported Pesticides

Some laboratories reported additional pesticides to those present in the test item. These reported pesticides are presented in Table 4.1.1.

Table 4.1.1. 'Other reported pesticides'.

Laboratory Code	Other Reported Pesticides
Lab013*	diafenthiuron, etoxazole, fenpyroximate, hexythiazox, lufenuron, pyridaben
Lab014*	diflubenzuron, flupyradifurone
Lab017	formetanate
Lab019	2,6-dichlorobenzamide
Lab022	bifenazate, diofenolan, fluoxastrobin
Lab024	dodemorph
Lab025	perchlorate
Lab026*	spirotetramat-enol
Lab041	N (2,4 - dimethylphenyl) formamide
Lab054	chlorpyrifos, spirotetramat
Lab055	cycloheximide, dodemorph, furmecyclox
Lab056	malaoxon
Lab057	terbuthylazine
Lab058*	imazalil, trichlorfon
Lab060	tetradifon, vinclozolin
Lab063	quinoclamine
Lab071	cyproconazole
Lab076	spirotetramat-enol
Lab079	atrazine, chlorpyrifos, diazinon
Lab080	fenothiocarb, furmecyclox
Lab081*	azobenzene

* National Reference Laboratories for Fruit and Vegetables from the EU participating in this test.

Those pesticides reported were analysed by the Organiser, but none was identified after repeated analyses.

4.1.2 Non-Reported Pesticides

Table 4.1a shows for each pesticide present in the sample, the number and percentage of laboratories that did not report them. The individual results for each laboratory are given in Appendix 1. Graphical representations can be seen in Appendix 2

4.2 Concentration levels.

Fourteen pesticides were used to spike the lemon test item at different levels, in the range between 0.014 mg/kg and 0.035 mg/kg. According to the homogeneity table 2.3a, all of them in concentrations lower than 0.100 mg/kg.

4.3 Assessment of laboratory performance.

No z score values were calculated. Classification was based on the number of results reported by each laboratory. Table 4.3.a classifies the laboratories according to the number of present pesticides reported.

Table 4.3.a Classification of laboratories
according to the number of present pesticides reported.

Laboratory Code	No of Reported Pesticides	% of Reported Pesticides	Other Reported Pesticides Not Confirmed by the Organiser
Lab028	14	100	0
Lab032	14	100	0
Lab034	14	100	0
Lab047	14	100	0
Lab080	14	100	2
Lab014*	14	100	2
Lab002	13	93	0
Lab007	13	93	0
Lab012	13	93	0
Lab018*	13	93	0
Lab027	13	93	0
Lab029	13	93	0
LAB052	13	93	0
Lab066	13	93	0
Lab073	13	93	0
Lab074*	13	93	0
Lab017	13	93	1
Lab001*	12	86	0
Lab015*	12	86	0
Lab023	12	86	0
Lab031	12	86	0
Lab033	12	86	0
Lab053*	12	86	0
Lab075	12	86	0
Lab081*	12	86	1
Lab054	12	86	2

Laboratory Code	No of Reported Pesticides	% of Reported Pesticides	Other Reported Pesticides Not Confirmed by the Organiser
Lab055	12	86	3
Lab005	11	79	0
Lab020	11	79	0
Lab021	11	79	0
Lab051	11	79	0
Lab061	11	79	0
LAB069	11	79	0
Lab076	11	79	1
Lab026*	11	79	1
Lab013*	11	79	6
Lab004	10	71	0
Lab006	10	71	0
Lab036	10	71	0
Lab037	10	71	0
Lab038*	10	71	0
Lab059	10	71	0
Lab078	10	71	0
Lab025	10	71	1
Lab056	10	71	1
Lab003*	9	64	0
Lab008	9	64	0
Lab009	9	64	0
Lab030	9	64	0
Lab062	8	57	0
Lab070	8	57	0
Lab077	8	57	0
Lab019	8	57	1
Lab058*	8	57	2
Lab035	7	50	0
Lab039*	7	50	0
Lab011*	6	43	0
Lab045	6	43	0
Lab041	6	43	1
Lab010	5	36	0
Lab050*	5	36	0
Lab057	5	36	1
Lab044	4	29	0
Lab049	4	29	0
Lab068	4	29	0
Lab063	3	21	1
Lab022	3	21	3
Lab046	2	14	0
Lab071	2	14	1
Lab024	2	14	1
Lab042	1	7	0
Lab060	1	7	2

Laboratory Code	No of Reported Pesticides	% of Reported Pesticides	Other Reported Pesticides Not Confirmed by the Organiser
Lab072	1	7	0
Lab048	0	0	0
Lab079	0	0	3

* National Reference Laboratories for Fruit and Vegetables from the EU participating in this test.

The extraction methods used by the laboratories, the chromatographic techniques, detectors, instrumentation, etc… are detailed in Appendix 3 (available only on the EUPT-FV-SM09 webpage, not in the printed version).

In Table 4.3.b there is a summary of the chromatographic techniques used for each pesticide, and a graphical representation is shown in Appendix 2.

Table 4.3.b Chromatographic techniques used to determine each pesticide in the test item

Pesticide	Total Number of Laboratories Reporting Data	*Total Number of Reported Detections	GC	Full Scan GC	LC	Full Scan LC
Bromuconazole	64	67	13	5	54	17
Cyflufenamid	61	65	20	7	45	19
Dieldrin	64	65	65	14	0	0
Fenpyrazamine	40	40	4	2	36	17
Fipronil	71	88	47	14	41	14
Flubendiamide	55	55	3	0	52	15
Isopyrazam	47	47	5	3	42	16
Novaluron	53	53	1	0	52	16
Orthosulfamuron	11	11	0	0	11	4
Penthiopyrad	40	41	8	2	33	14
Pyridalil	45	47	15	6	32	14
Spinetoram	47	50	1	0	49	18
Tricyclazole	58	61	5	2	56	15
Valifenalate	30	30	3	0	27	9

*Note: the number of reported detections for each of the pesticides could be different to the number of laboratories reporting the pesticide because a particular laboratory might have analysed one pesticide with more than one technique.

Table 4.3.c shows the number and percentage of the pesticides present in the sample which were reported by each laboratory. National Reference Laboratories are marked with an asterisk.

Table 4.3.c Number and Percentage of Present Pesticides Reported by Laboratory

Laboratory Code	Number of Present Pesticides Reported (14 Evaluated Pesticides)	% of Present Pesticides Reported (14 Evaluated Pesticides)
Lab001*	12	86
Lab002	13	93
Lab003*	9	64
Lab004	10	71
Lab005	11	79
Lab006	10	71
Lab007	13	93
Lab008	9	64

Laboratory Code	Number of Present Pesticides Reported (14 Evaluated Pesticides)	% of Present Pesticides Reported (14 Evaluated Pesticides)
Lab009	9	64
Lab010	5	36
Lab011*	6	43
Lab012	13	93
Lab013*	11	79
Lab014*	14	100
Lab015*	12	86
Lab017	13	93
Lab018*	13	93
Lab019	8	57
Lab020	11	79
Lab021	11	79
Lab022	3	21
Lab023	12	86
Lab024	2	14
Lab025	10	71
Lab026*	11	79
Lab027	13	93
Lab028	14	100
Lab029	13	93
Lab030	9	64
Lab031	12	86
Lab032	14	100
Lab033	12	86
Lab034	14	100
Lab035	7	50
Lab036	10	71
Lab037	10	71
Lab038*	10	71
Lab039*	7	50
Lab041	6	43
Lab042	1	7
Lab044	4	29
Lab045	6	43
Lab046	2	14
Lab047	14	100
Lab048	0	0
Lab049	4	29
Lab050*	5	36
Lab051	11	79
LAB052	13	93
Lab053*	12	86
Lab054	12	86
Lab055	12	86
Lab056	10	71

Laboratory Code	Number of Present Pesticides Reported (14 Evaluated Pesticides)	% of Present Pesticides Reported (14 Evaluated Pesticides)
Lab057	5	36
Lab058*	8	57
Lab059	10	71
Lab060	1	7
Lab061	11	79
Lab062	8	57
Lab063	3	21
Lab066	13	93
Lab068	4	29
LAB069	11	79
Lab070	8	57
Lab071	2	14
Lab072	1	7
Lab073	13	93
Lab074*	13	93
Lab075	12	86
Lab076	11	79
Lab077	8	57
Lab078	10	71
Lab079	0	0
Lab080	14	100
Lab081*	12	86

* National Reference Laboratories for Fruit and Vegetables from the EU participating in this test.

5. CONCLUSIONS

Eighty-three laboratories agreed to participate in this proficiency test on screening methods. Seventy-five laboratories submitted results. Fifteen of the laboratories were National Reference Laboratories for Fruit and Vegetables (marked with an asterisk on the graphs and tables). Twenty EU Member States and in addition to these, 1 EFTA country (Switzerland) as well as six non-EU/EFTA countries (China, Costa Rica, Kenya, Serbia, Turkey and Zambia) participated in this European Union Proficiency Test.

Most laboratories analysed the test item using methods based on both gas and liquid chromatography combined with mass spectrometric detection. Of 717 detections, 189 were made by GC and 528 by LC, 243 were made using full-scan, meaning 34% of detections (188 by LC-full scan techniques and 55 by GC-full scan techniques); 32% of the laboratories reported their results using HRMS (high resolution accurate mass spectrometry); 79.6% of the results were reported indicating a concentration value.

Six of the 75 laboratories were able to detect all 14 present pesticides in the lemon test item. Nineteen laboratories detected less than 50 % of the pesticides present.

Sixtyy percent of the laboratories (45 laboratories) that reported results were able to find more than 70 % of the evaluated pesticides.

Twenty-one participants reported 37 different pesticides which were not present in the lemon test items. Whether this should be judged as poor performance, or not, depends on how each participant would act on these positive findings in routine analysis. If the reported pesticide was reported as positive with no further identifying confirmation, then the result would be a false positive and hence erroneous monitoring data would be reported. If the reported pesticide is regarded simply as 'suspect' or 'indicatively present', leading to additional analysis to confirm identity before reporting the result, then those pesticides indicated as 'other reported pesticides' in this report are not really an issue.

As in previous years, EUPT-SM interlaboratory tests on wide-scope screening methods showed that such an approach can substantially expand the scope of pesticide residue analysis. This is especially useful for pesticides not frequently found in food and feed, or not monitored by the laboratories because they are not part of the EU-Coordinated Programme. The use of screening methods can greatly increase the chance of detecting less commonly found pesticides. However, the test also revealed that improvements in scope (both in number and the choice of pesticides included) and verification of the screening methods performance (i.e. validation) are necessary to increase the reliability of such methods.

6. SUGGESTIONS FOR FUTURE WORK

The Organiser and the Scientific Committee consider that screening methods have provided additional value to the current quantitative multiresidue methods routinely used for monitoring purposes. The results of this test are most encouraging, but also indicate the need for continued evaluation of screening methods. Therefore, further proficiency tests will be organised to provide support to those laboratories using screening methods in order to extend their use and improve their reliability. These methods will be used more and more as screens/filters, to make routine laboratory work easier and faster. The need for screening method validation has been recognised and guidelines for such validation have been prepared and included in the Document SANTE/11945/2015.

Next year, the matrix of the test item will be green bean homogenate. Once again participants will be invited to report the estimated concentration of the pesticides identified. The concentration value will be used for informative purposes only, and not for the evaluation of the laboratories.

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8. ACKNOWLEDGEMENTS

The Organiser is grateful to the European Commission for funding this 9th European Proficiency Test for Screening Methods in Fruit and Vegetables.

The Organiser wishes to thank the members of the Scientific Committee for their invaluable and knowledgeable advice.

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

APPENDIX 1. Results

Table AP1a. Reported pesticides

Laboratory Code Total No of Reporting Laboratories = 75	Evaluated Pesticides (14)														Reported Pesticides by Laboratory	% of Reported Pesticides by Laboratory
	Bromuconazole	Cyflufenamid	Dieldrin	Fenpyrazamine	Fipronil	Flubendiamide	Isopyrazam	Novaluron	Orthosulfamuron	Penthiopyrad	Pyridalil	Spinetoram	Tricyclazole	Valifenalate		
Lab001*	R	R	R	R	R	R	R	R		R	R	R	R		12	86
Lab002	R	R	R	R	R	R	R	R		R	R	R	R	R	13	93
Lab003*	R	R	R		R	R		R		R	R		R		9	64
Lab004	R	R	R		R	R	R	R			R		R	R	10	71
Lab005	R	R	R	R	R	R	R	R		R	R		R		11	79
Lab006	R	R	R		R			R	R		R	R	R	R	10	71
Lab007	R	R	R	R	R	R	R	R		R	R	R	R	R	13	93
Lab008	R	R	R		R			R			R	R	R	R	9	64
Lab009	R	R	R		R				R		R	R	R	R	9	64
Lab010	R		R		R			R				R			5	36
Lab011*	R	R	R		R	R							R		6	43
Lab012	R	R	R	R	R	R	R	R	R	R	R	R	R		13	93
Lab013*	R		R	R	R	R	R	R	R	R		R	R		11	79
Lab014*	R	R	R	R	R	R	R	R	R	R	R	R	R	R	14	100
Lab015*	R	R	R	R	R	R	R	R		R	R	R	R		12	86
Lab017	R	R	R	R	R	R	R	R		R	R	R	R	R	13	93
Lab018*	R	R	R	R	R	R	R	R		R	R	R	R	R	13	93
Lab019	R	R	R	R	R		R					R	R		8	57
Lab020	R	R	R		R	R	R	R			R	R	R	R	11	79
Lab021	R	R	R	R	R	R	R	R			R	R	R		11	79
Lab022	R	R			R										3	21
Lab023	R	R	R	R	R	R	R	R		R	R	R	R		12	86
Lab024	R				R										2	14
Lab025	R	R	R	R	R	R		R			R	R	R		10	71
Lab026*	R	R		R	R	R	R	R		R	R	R		R	11	79
Lab027	R	R	R	R	R	R	R	R		R	R	R	R	R	13	93
Lab028	R	R	R	R	R	R	R	R	R	R	R	R	R	R	14	100
Lab029	R	R	R	R	R	R	R	R		R	R	R	R	R	13	93
Lab030		R	R	R	R	R	R	R			R	R			9	64
Lab031	R	R	R	R	R	R	R	R		R	R	R	R		12	86
Lab032	R	R	R	R	R	R	R	R	R	R	R	R	R	R	14	100
Lab033	R	R	R	R	R	R	R	R	R	R	R		R		12	86
Lab034	R	R	R	R	R	R	R	R	R	R	R	R	R	R	14	100
Lab035	R	R	R		R	R		R					R		7	50
Lab036	R	R	R		R	R	R	R		R			R	R	10	71
Lab037	R	R	R		R	R	R	R		R			R	R	10	71
Lab038*	R	R	R		R	R	R	R		R			R	R	10	71
Lab039*	R	R	R		R	R					R		R		7	50
Lab041	R		R		R			R				R	R		6	43
Lab042					R										1	7
Lab044		R	R		R					R					4	29
Lab045	R	R	R		R			R					R		6	43
Lab046			R		R										2	14
Lab047	R	R	R	R	R	R	R	R	R	R	R	R	R	R	14	100
Lab048															0	0
Lab049	R	R	R		R										4	29
Lab050*	R		R		R	R							R		5	36
Lab051	R	R	R	R	R	R	R	R			R	R	R		11	79

APPENDIX 1

Laboratory Code Total No of Reporting Laboratories = 75	Evaluated Pesticides (14)														Reported Pesticides by Laboratory	% of Reported Pesticides by Laboratory
	Bromuconazole	Cyflufenamid	Dieldrin	Fenpyrazamine	Fipronil	Flubendiamide	Isopyrazam	Novaluron	Orthosulfamuron	Penthiopyrad	Pyridalil	Spinetoram	Tricyclazole	Valifenalate		
Lab052	R	R	R	R	R	R	R	R		R	R	R	R	R	13	93
Lab053*	R	R	R	R	R	R	R	R		R		R	R	R	12	86
Lab054	R	R	R	R	R	R	R			R	R	R	R	R	12	86
Lab055	R	R		R	R	R	R	R		R	R	R	R	R	12	86
Lab056	R	R	R	R	R	R	R	R		R		R			10	71
Lab057	R	R	R		R								R		5	36
Lab058*		R	R		R	R	R			R			R	R	8	57
Lab059	R	R		R		R	R	R		R	R	R	R		10	71
Lab060					R										1	7
Lab061	R	R	R	R	R	R	R	R			R	R	R		11	79
Lab062	R		R		R	R	R	R				R	R		8	57
Lab063			R		R								R		3	21
Lab066	R	R	R	R	R	R	R	R		R	R	R	R	R	13	93
Lab068	R				R	R					R				4	29
Lab069	R	R	R		R	R	R	R		R	R	R	R		11	79
Lab070	R	R	R		R	R		R				R	R		8	57
Lab071		R			R										2	14
Lab072			R												1	7
Lab073	R	R	R	R	R	R	R	R		R	R	R	R	R	13	93
Lab074*	R	R	R	R	R	R	R	R		R	R	R	R	R	13	93
Lab075	R	R	R	R	R	R	R			R	R	R	R	R	12	86
Lab076	R	R	R	R	R	R	R	R		R	R		R		11	79
Lab079															0	0
Lab077	R	R	R		R	R		R			R	R			8	57
Lab078	R	R	R	R	R	R	R	R				R	R		10	71
Lab080	R	R	R	R	R	R	R	R	R	R	R	R	R	R	14	100
Lab081*	R	R	R	R	R	R	R	R		R	R	R	R		12	86
Reported Pesticides	64	61	64	40	71	55	47	53	11	40	45	47	58	30		
% of Reported Pesticides	85	81	85	53	95	73	63	71	15	53	60	63	77	40		

R: Reported pesticide * National Reference Laboratories for Fruit and Vegetables from the EU participating in this test U

Table AP1b. Estimated Concentrations Reported
Not all the laboratories reporting results have reported estimated concentration values
Results reported without concentration values are expressed as R.

Laboratory Code Total No of Reporting Laboratories =75	Evaluated Pesticides (14)													
	Bromuconazole	Cyflufenamid	Dieldrin	Fenpyrazamine	Fipronil	Flubendiamide	Isopyrazam	Novaluron	Orthosulfamuron	Penthiopyrad	Pyridalil	Spinetoram	Tricyclazole	Valifenalate
Homogeneity (mg/kg)	**0.014**	**0.031**	**0.019**	**0.028**	**0.021**	**0.034**	**0.025**	**0.031**	Not calculated	**0.021**	**0.022**	**0.018**	**0.015**	**0.019**
Robust Mean (mg/kg)	**0.014**	**0.027**	**0.017**	**0.025**	**0.018**	**0.030**	**0.021**	**0.028**	Not calculated	**0.018**	**0.026**	**0.013**	**0.017**	**0.016**
CV (%)	**30.7**	**18.7**	**27.4**	**19.7**	**35.5**	**24.9**	**16.2**	**39.4**	Not calculated	**17.1**	**27.2**	**29.8**	**23.8**	**37.7**
Lab001*	0.01	0.028	0.018	0.025	0.011	0.011	0.015	0.028		0.018	0.02	0.021	0.025	
Lab002	0.012	0.029	0.017	0.021	0.013	0.029	0.021	0.035		0.016	0.034	0.012	0.018	0.016
Lab003*	0.012	0.023	0.013		0.02	0.035		0.019		0.02	0.035		0.017	
Lab004	0.012	0.028	0.023		0.015	0.023	0.019	0.023			0.022		0.015	0.02
Lab005	0.016	0.016	0.012	0.025	0.012	0.032	0.026	0.041		0.017	0.025		0.019	
Lab006	0.0155	0.0369	0.0248		0.0243			0.0064	0.038		0.0274	0.0175	0.0197	0.0234
Lab007	R	R	R	R	R	R	R	R		R	R	R	R	R
Lab008	0.015	0.01	0.01		0.006			0.005			0.001	0.008	0.01	0.006
Lab009	0.0113	0.0303	0.0344		0.0207				0.0286		0.0302	0.017	0.0165	0.0182
Lab010	0.098		R		0.075			0.02				0.012		
Lab011*	0.01	R	0.01		0.014	0.02							0.014	
Lab012	0.01473	R	0.02	0.02153	0.02027	0.03573	0.01893	R	R	0.01567	R	R	0.01667	
Lab013*	0.01		0.025	0.02	0.13	0.5	0.02	R	R	0.015		0.01	0.01	
Lab014*	0.01	0.01	0.02	R	0.02	R	0.02	0.02	R	0.02	0.02	R	0.01	0.01
Lab015*	0.007	R	0.015	R	0.032	0.026	R	0.011		R	0.011	R	0.014	
Lab017	R	R	R	R	R	R	R	R		R	R	R	R	R
Lab018*	0.019	0.029	0.028	0.029	0.038	0.03	0.025	0.041		0.021	0.029	0.015	0.021	0.02
Lab019	0.013	0.027	0.017	0.023	0.012		0.02					0.013	0.016	
Lab020	0.01	0.027	0.013		0.015	0.064	0.022	0.014			0.026	0.019	0.017	0.048
Lab021	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.03			0.03	0.01	0.01	
Lab022	0.017	0.048			R									
Lab023	R	R	R	R	R	R	R	R		R	R	R	R	
Lab024	0.02				0.03									
Lab025	0.015	0.028	0.02	0.02	0.019	0.02		0.03			0.03	0.017	0.019	
Lab026*	R	R		R	R	R	R	R		R	R	R		R
Lab027	0.012	0.025	0.012	0.021	0.017	0.028	0.018	0.028		0.02	0.024	0.012	0.019	0.01
Lab028	0.01033	0.054	0.01367	0.02157	0.01433	0.02975	0.019	0.0555	0.9505	0.017	0.229	0.013	0.01871	0.01625
Lab029	0.005	0.023	0.015	0.024	0.018	0.03	0.031	0.028		0.017	0.021	0.015	0.013	0.007
Lab030		0.027	0.019	0.029	0.009	0.04	0.022	0.032			0.013	0.016		
Lab031	0.015	0.03	0.026	0.03	0.025	0.04	0.03	0.02		0.021	0.04	0.005	0.015	
Lab032	0.013	0.026	0.022	0.027	0.016	0.036	0.022	0.034	0.89	0.024	0.025	0.01	0.022	0.008
Lab033	0.017	0.028	0.014	0.035	0.024	0.053	0.034	0.061	0.114	0.021	0.041		0.022	
Lab034	0.01	0.03	0.036	0.025	0.025	0.03	0.023	0.03	R	0.02	0.037	0.02	0.01	0.014
Lab035	0.012	0.016	0.01		0.018	0.02		0.06					0.019	
Lab036	0.012	0.025	0.016		0.014	0.024	0.017	0.022		0.013			0.019	0.018
Lab037	0.012	0.028	0.016		0.017	0.029	0.02	0.024		0.018			0.018	0.017
Lab038*	0.018	0.03	0.019		0.027	0.02	0.02	0.051		0.02			0.026	0.023
Lab039*	0.02	R	0.019		0.02	0.031					0.029		0.02	
Lab041	0.016		0.006		0.009			0.016				0.009	0.01	
Lab042					0.02									
Lab044		0.033	0.016		0.019					0.018				
Lab045	0.016	R	0.013		0.011			R					0.012	
Lab046			R		0.03									
Lab047	0.01	0.025	0.019	0.025	0.01	0.025	0.02	0.015	R	0.02	0.02	0.01	0.015	

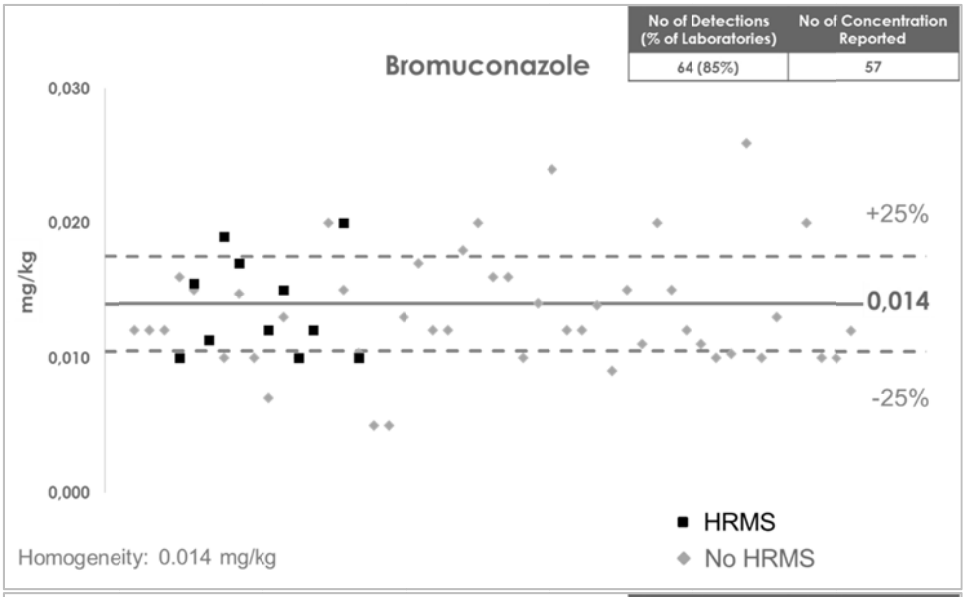
APPENDIX 1

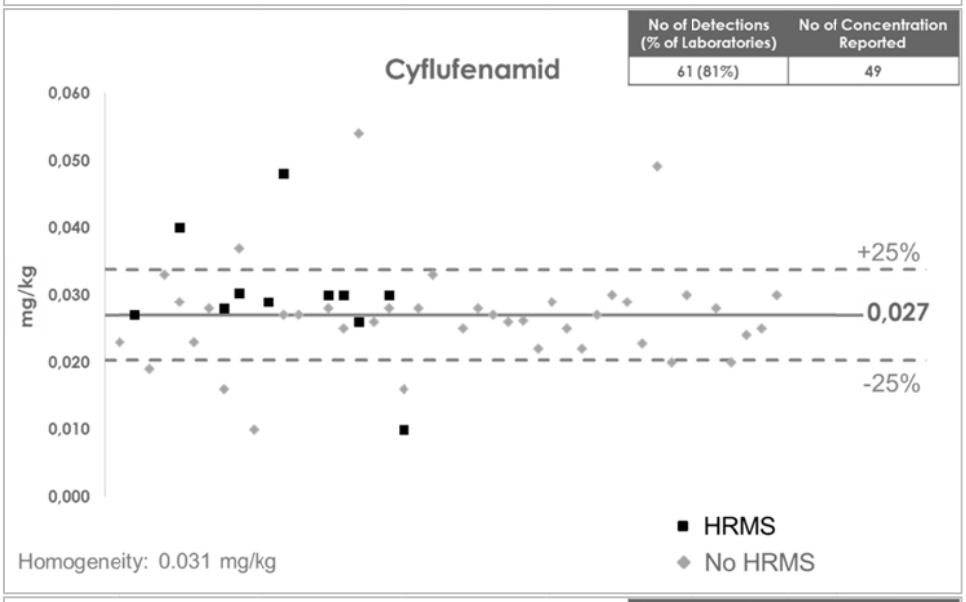
Laboratory Code Total No of Reporting Laboratories =75	Evaluated Pesticides (14)													
	Bromuconazole	Cyflufenamid	Dieldrin	Fenpyrazamine	Fipronil	Flubendiamide	Isopyrazam	Novaluron	Orthosulfamuron	Penthiopyrad	Pyridalil	Spinetoram	Tricyclazole	Valifenalate
Homogeneity (mg/kg)	**0.014**	**0.031**	**0.019**	**0.028**	**0.021**	**0.034**	**0.025**	**0.031**	Not calculated	**0.021**	**0.022**	**0.018**	**0.015**	**0.019**
Robust Mean (mg/kg)	**0.014**	**0.027**	**0.017**	**0.025**	**0.018**	**0.030**	**0.021**	**0.028**	Not calculated	**0.018**	**0.026**	**0.013**	**0.017**	**0.016**
CV (%)	**30.7**	**18.7**	**27.4**	**19.7**	**35.5**	**24.9**	**16.2**	**39.4**	Not calculated	**17.1**	**27.2**	**29.8**	**23.8**	**37.7**
Lab048														
Lab049	0.014	0.028	0.018		0.023									
Lab050*	0.024		0.02		0.02	0.023							0.023	
Lab051	0.012	0.027	0.021	0.03	0.019	0.036	0.022	0.035			0.03	0.015	0.019	
LAB052	0.012	0.026	0.016	0.02	0.013	0.025	0.015	0.023		0.011	0.021	0.01	0.017	0.011
Lab053*	0.01385	0.0262	0.01747	R	0.0171	0.0318	R	0.03165		R		0.01142	0.0193	0.01945
Lab054	R	0.04	0.02	0.025	0.02	0.045	0.02			0.02	R	R	R	R
Lab055	R	R		R	R	R	R	R		R	R	R	0.019	R
Lab056	0.009	0.022	0.009	0.021	0.014	0.033	0.015	0.005		0.035		0.008		
Lab057	0.047	R	0.021		0.028								0.01	
Lab058*		0.019	R		0.014	R	R			0.016			R	0.019
Lab059	0.012	0.026		0.027		0.026	0.021	0.031		0.021	0.022	0.012	0.019	
Lab060					0.015									
Lab061	0.015	0.029	0.019	0.033	0.018	0.028	0.02	0.032			0.027	0.016	0.036	
Lab062	0.011		0.015		0.015	0.027	0.019	0.033				0.014	0.016	
Lab063			0.02		0.0106								0.0152	
Lab066	0.02	0.025	0.016	0.028	0.017	0.036	0.022	0.029		0.017	0.026	0.012	0.017	0.011
Lab068	0.02				0.01	0.02					0.02			
LAB069	0.015	0.022	0.016		0.016	0.026	0.016	0.03		0.016	0.027	0.011	0.02	
Lab070	0.012	0.027	0.019		0.018	0.023		0.022				0.011	0.017	
Lab071		0.033			0.13									
Lab072			0.014											
Lab073	0.011	0.03	0.02	0.056	0.015	0.024	0.02	0.032		0.015	0.027	0.01	0.017	0.018
Lab074*	0.01	0.029	0.016	0.023	0.016	0.028	0.02	0.032		0.017	0.022	0.011	0.018	0.016
Lab075	0.01028	0.02273	0.01145	0.02140	0.01600	0.02469	0.01575			0.01378	0.02537	0.009	0.01571	0.01453
Lab076	0.026	0.049	0.011	0.053	0.025	0.066	0.18	0.066		0.043	0.027		0.026	
Lab077	0.01	0.02	0.02		0.02	0.03		0.02			0.01	0.03		
Lab078	0.013	0.03	0.019	R	0.019	0.031	0.023	0.031				0.014	0.02	
Lab080	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Lab081*	0.02	0.03	0.02	0.03	0.03	0.03	0.02	0.03		0.02	0.03	R	0.02	

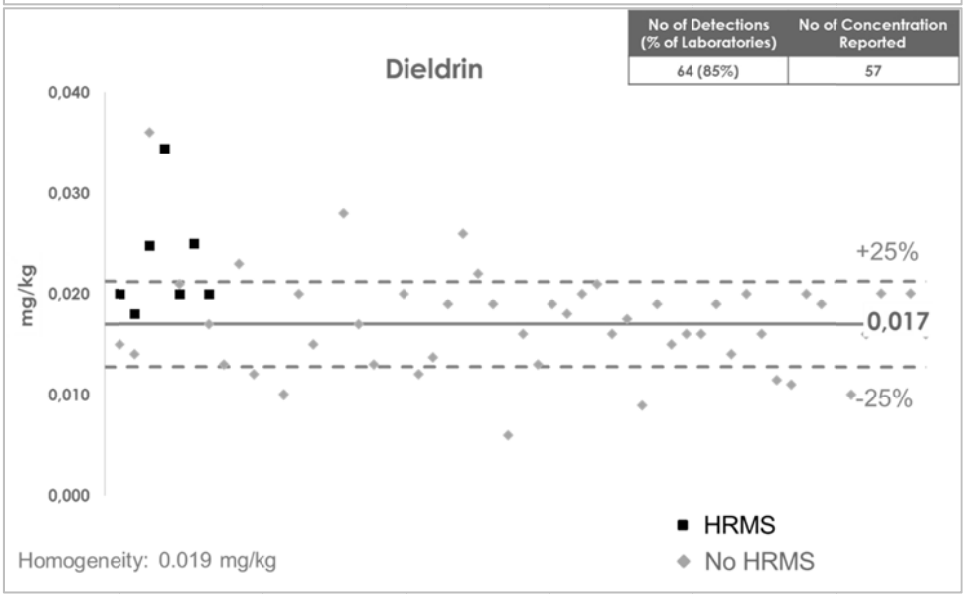
* National Reference Laboratories for Fruit and Vegetables from the EU participating in this test

APPENDIX 2. Graphical Representations

The bold line represents the robust mean

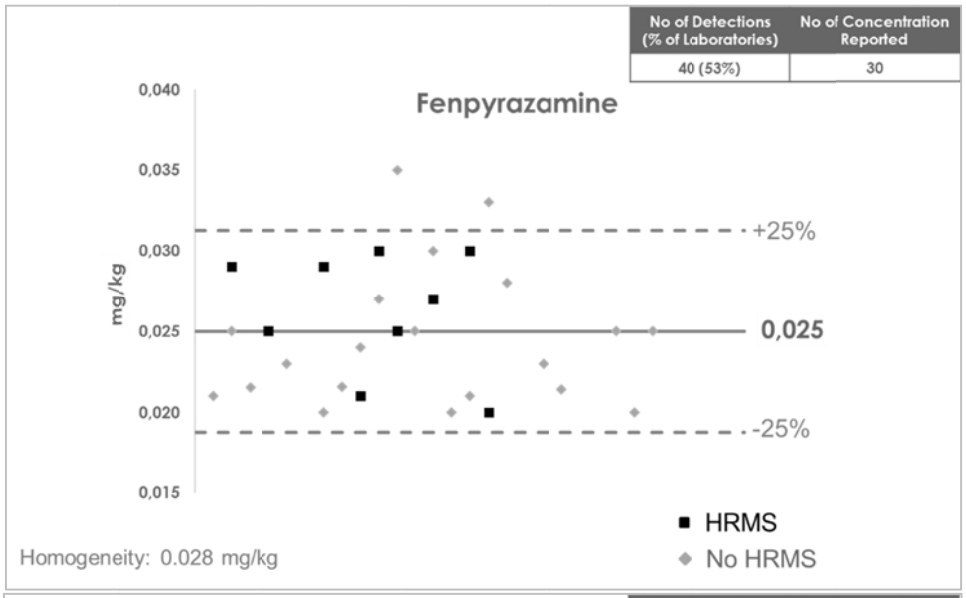


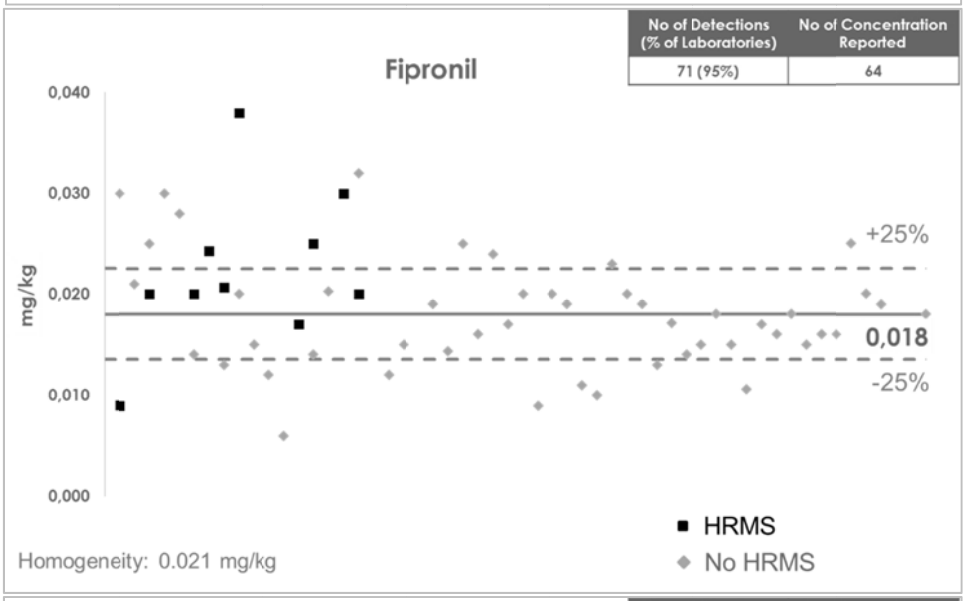


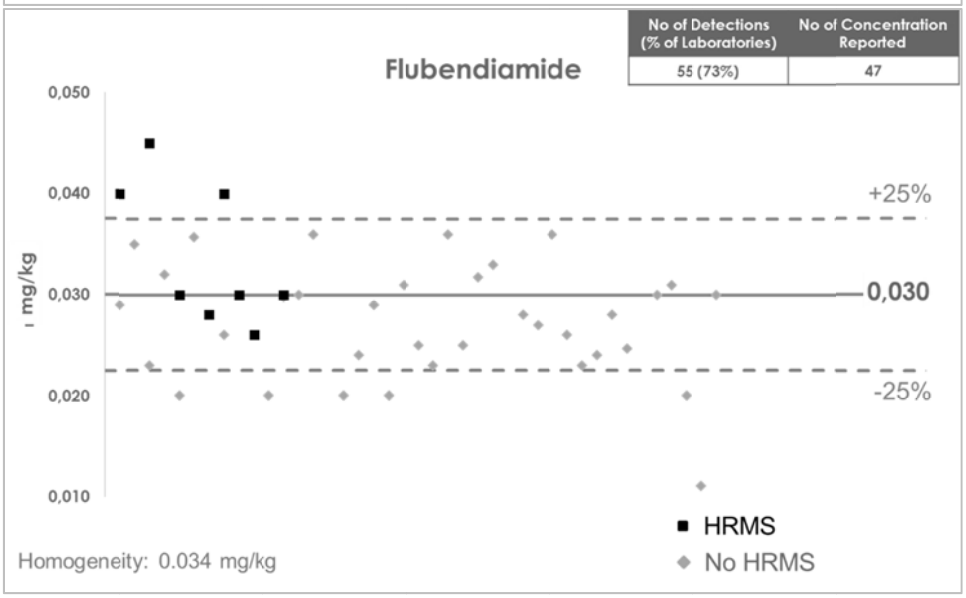


APPENDIX 2. Graphical Representations

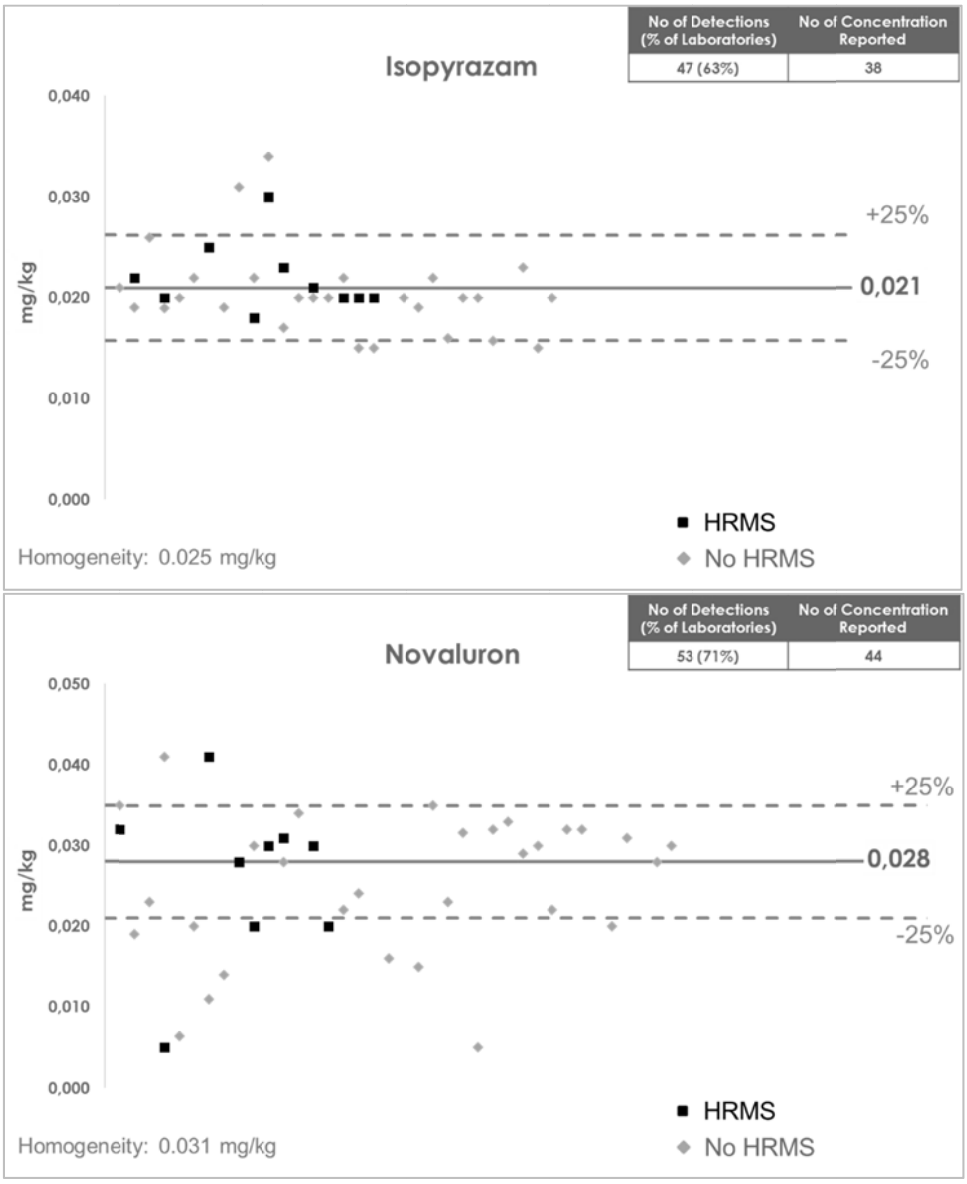
The bold line represents the robust mean







The bold line represents the robust mean

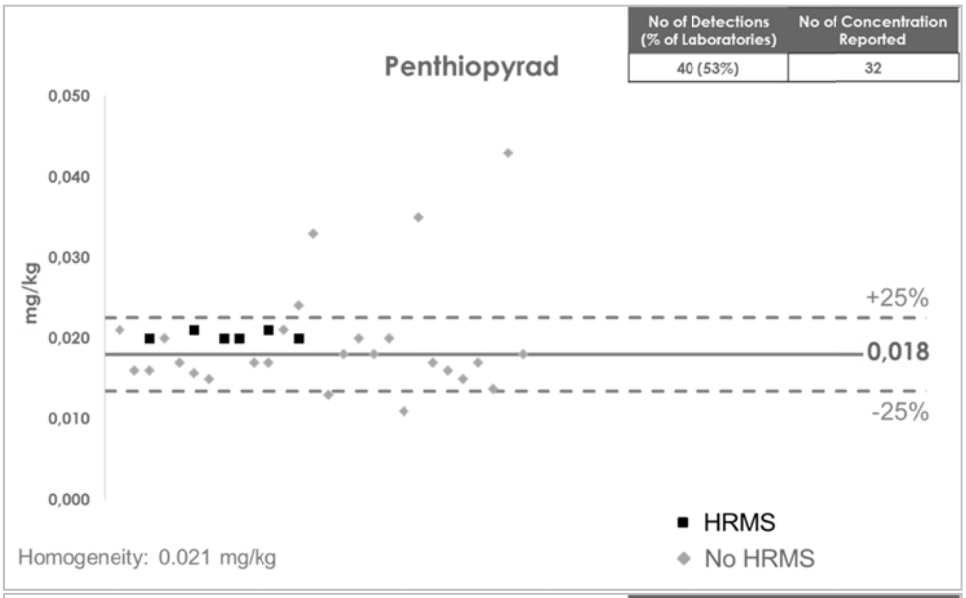


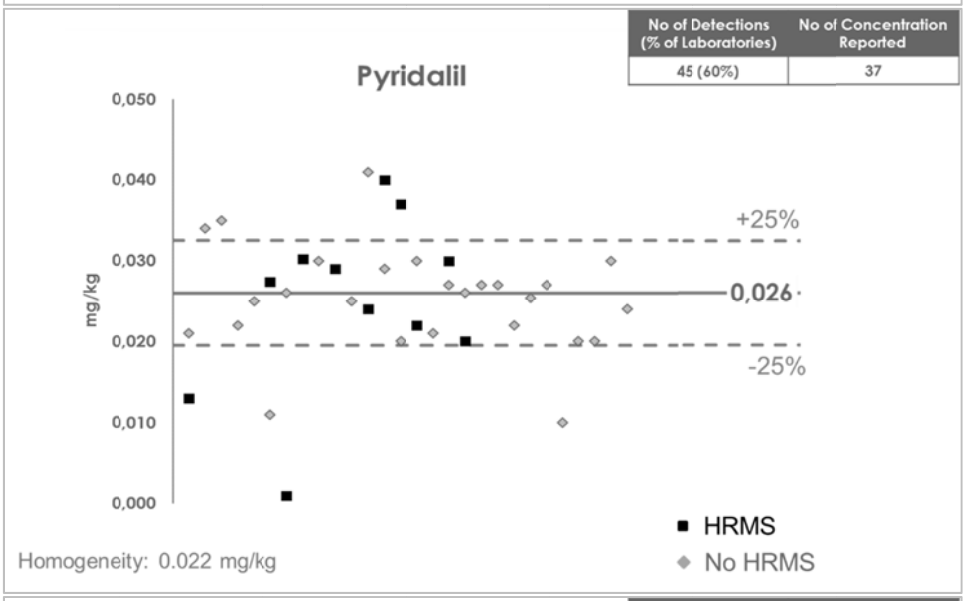
ORTHOSULFAMURON:

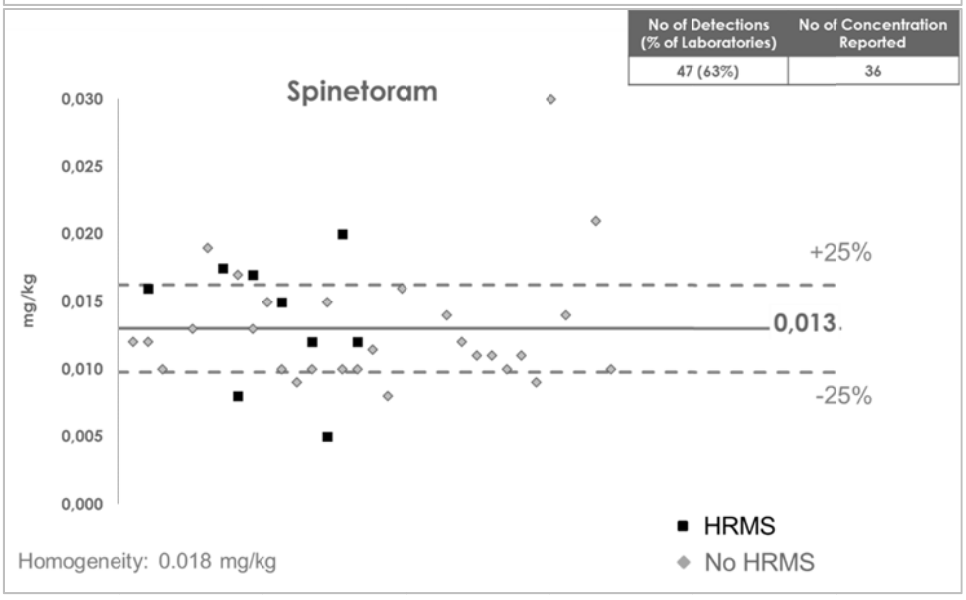
These results haven't been calculated because of the low number of concentration results reported.

APPENDIX 2. Graphical Representations

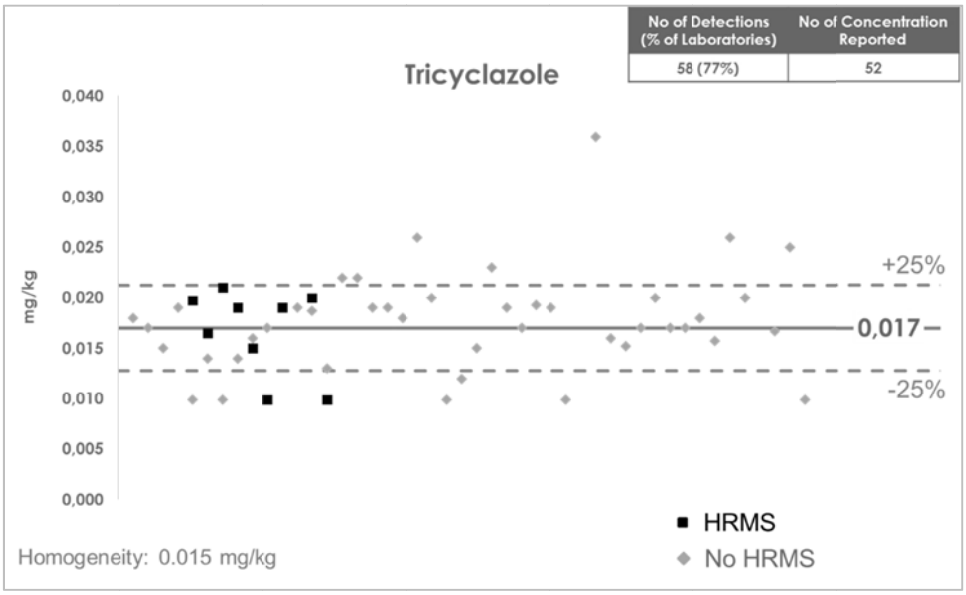
The bold line represents the robust mean

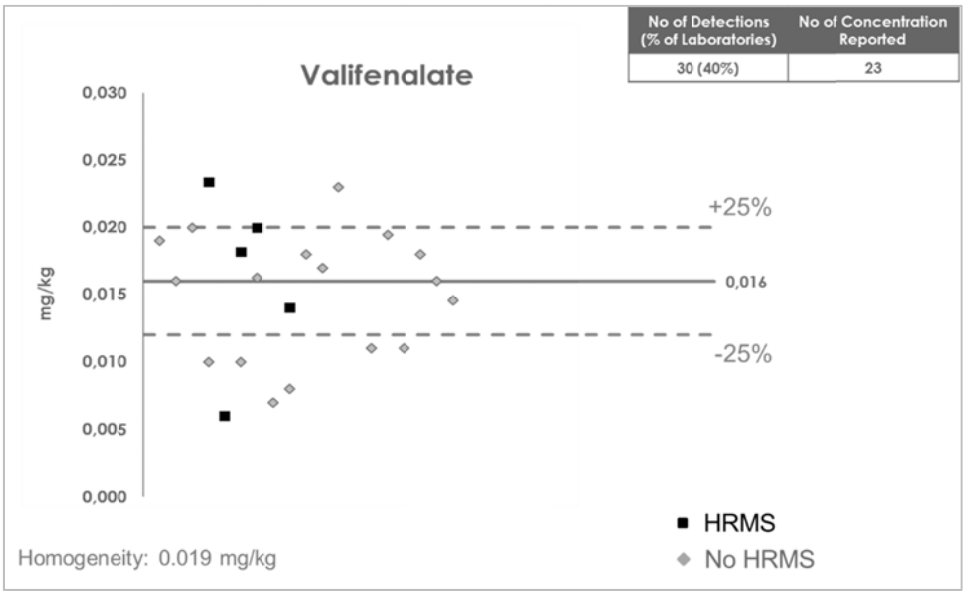




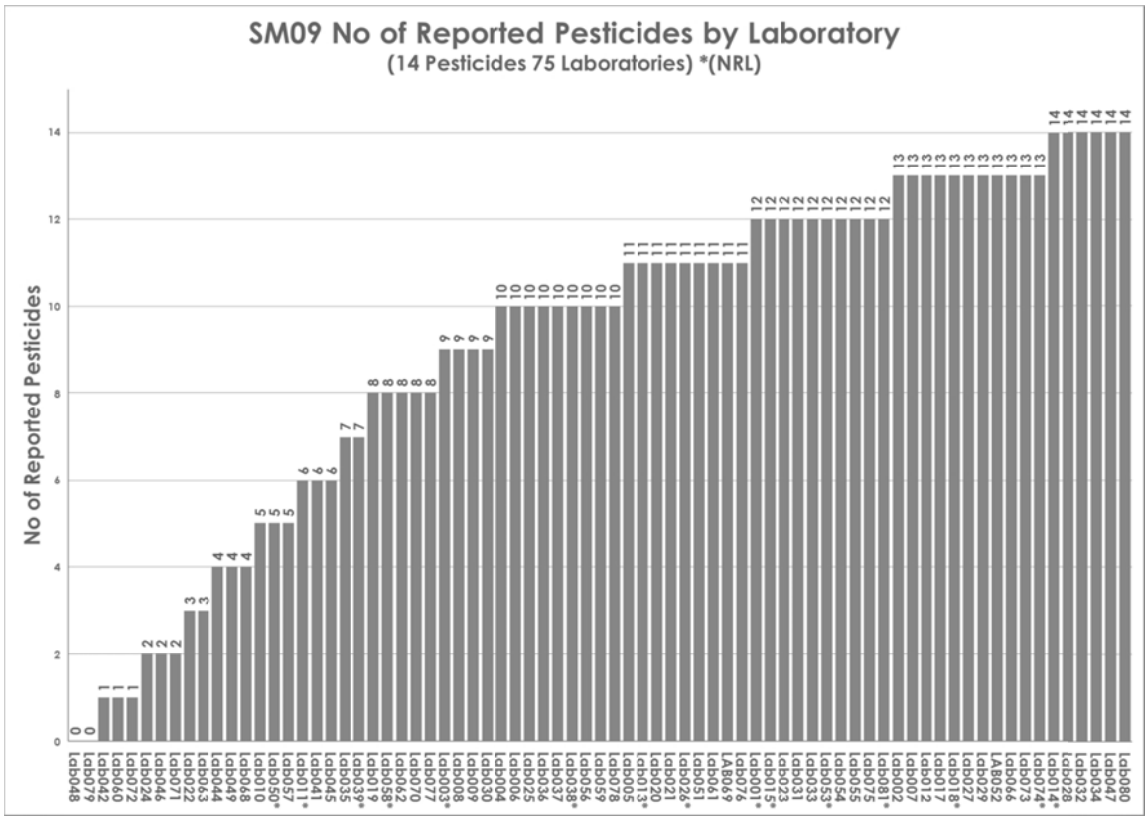


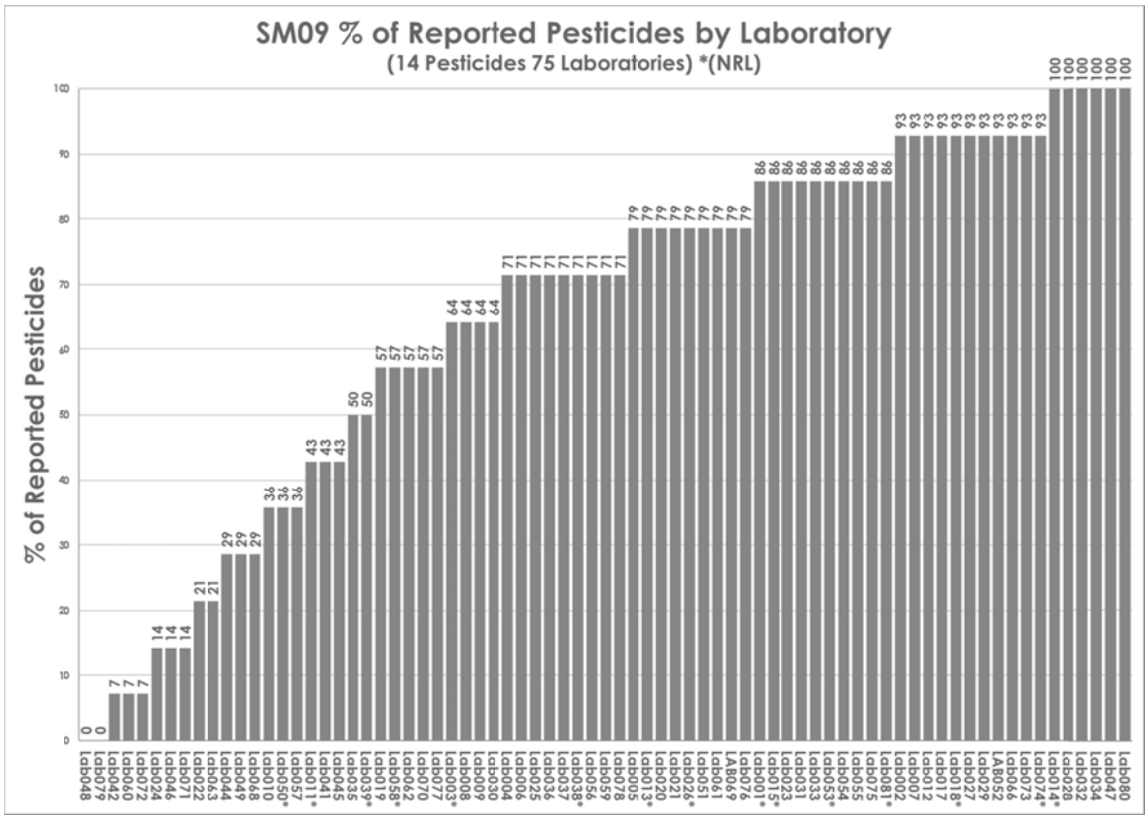
The bold line represents the robust mean

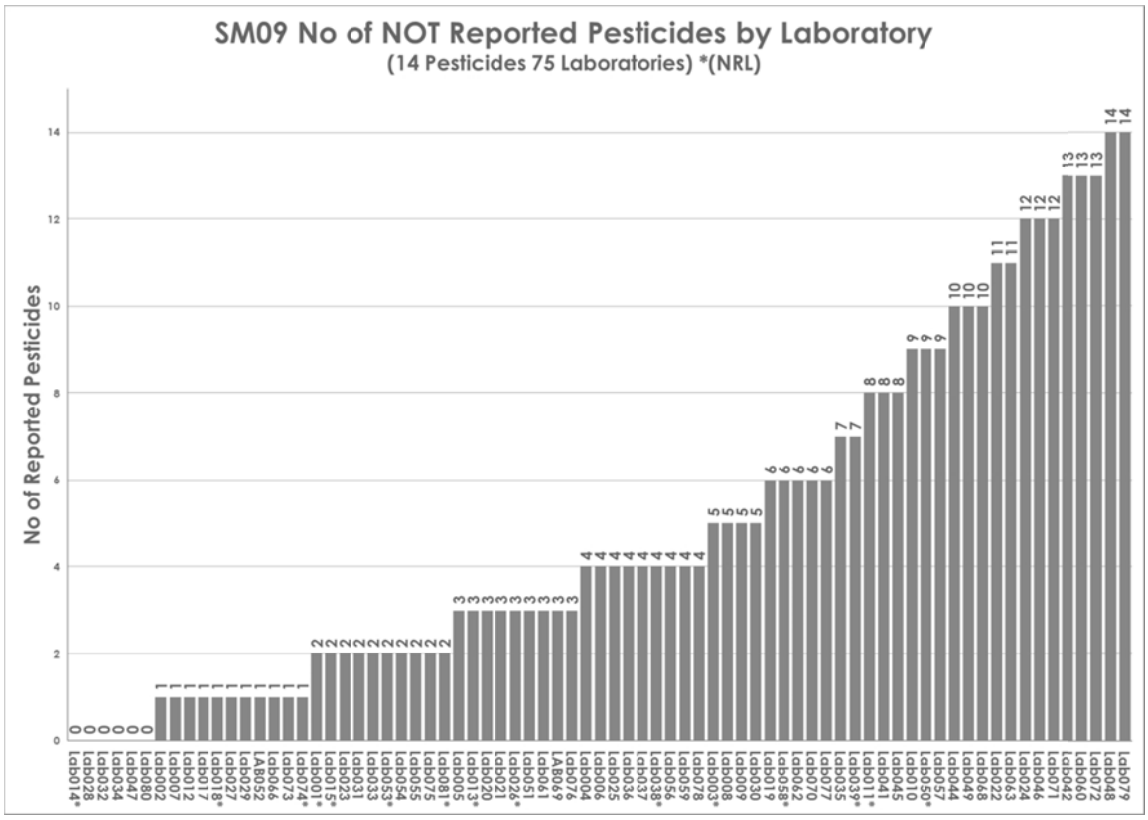


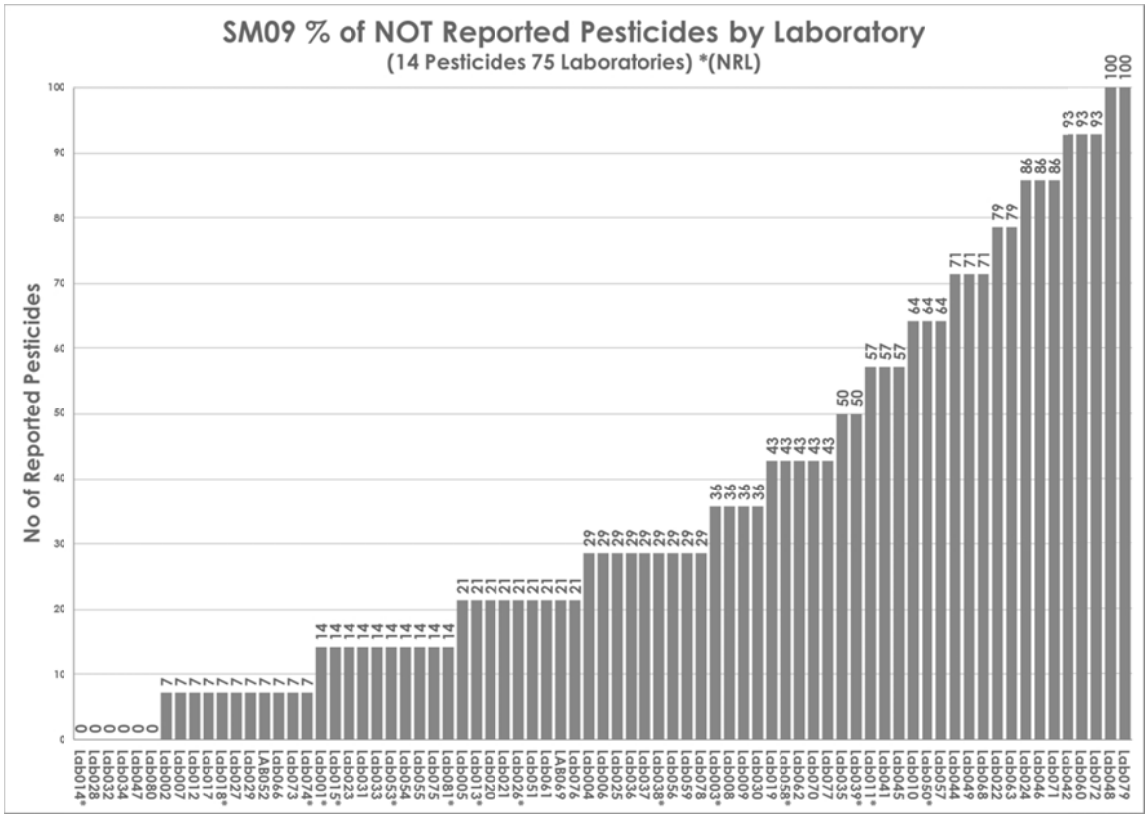


APPENDIX 2. Graphical Representations






SM09 No of NOT Reported Pesticides by Laboratory
(14 Pesticides 75 Laboratories) *(NRL)
No of Reported Pesticides


SM09 % of NOT Reported Pesticides by Laboratory
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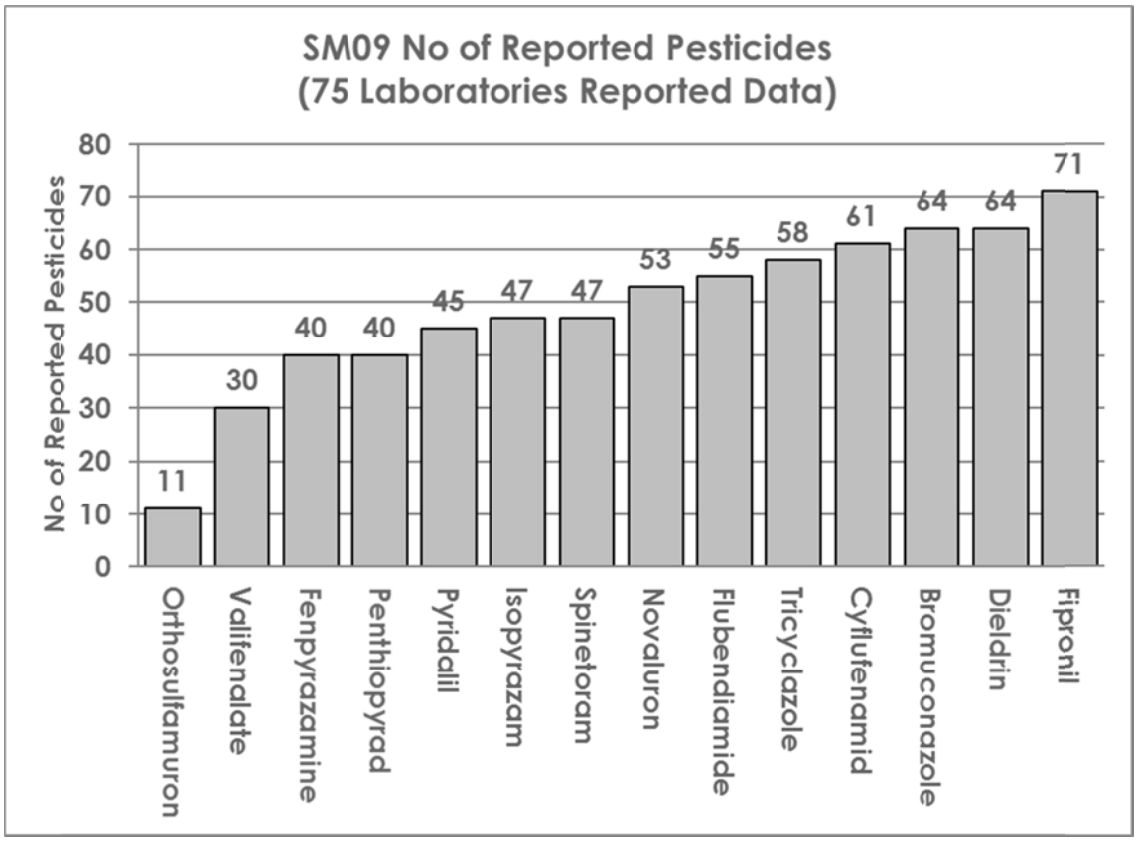
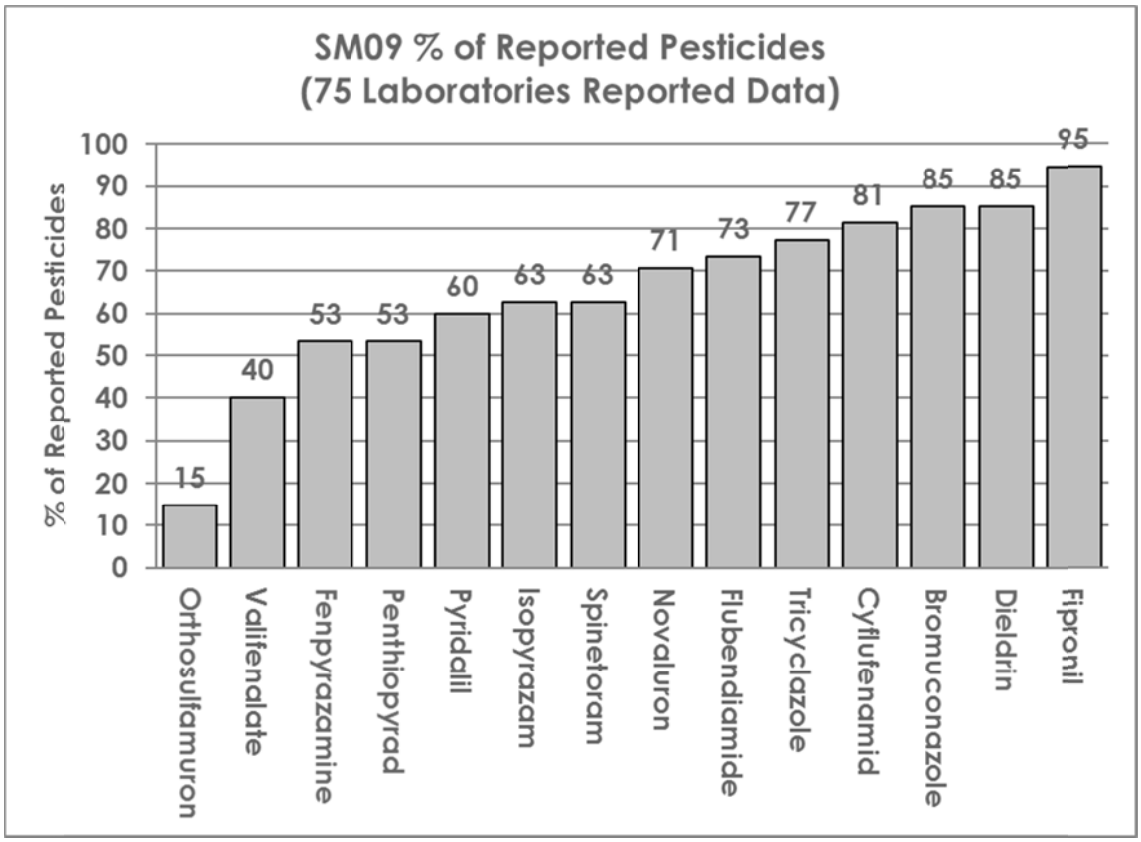
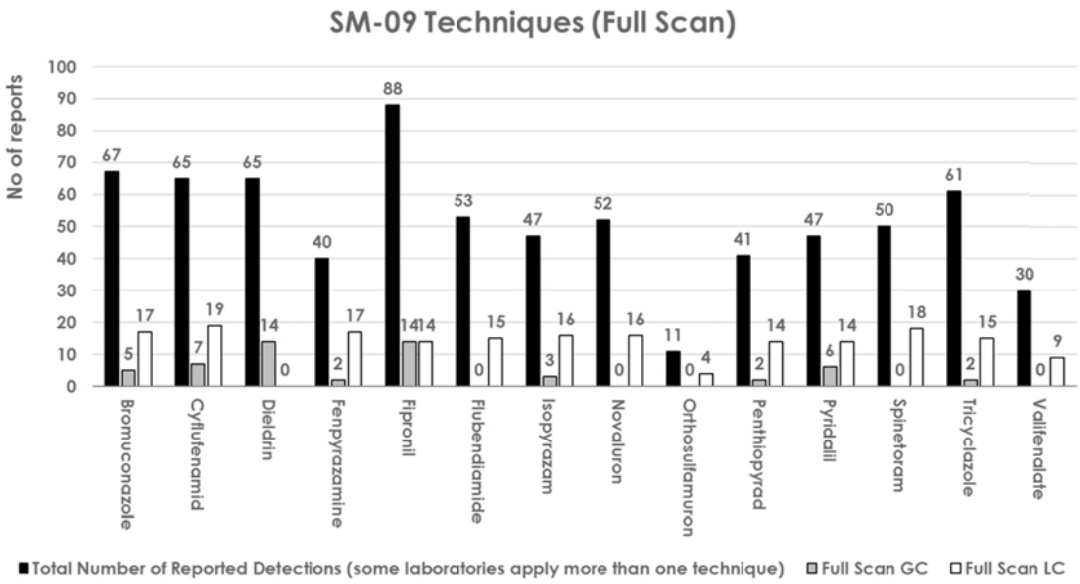
APPENDIX 2. Graphical Representations





Chromatographic Techniques used in Full Scan to determine each pesticide in the test item



ANNEX 1. List of Laboratories that reported results in EUPT-FV-SM09.

COUNTRY	LABORATORY NAME	CITY
AUSTRIA	AUSTRIAN AGENCY FOR HEALTH AND FOOD SAFETY, INSTITUTE FOR FOOD SAFETY INNSBRUCK DEPARTMENT FOR PESTICIDE AND FOOD ANALYTICS	INNSBRUCK
BELGIUM	PRIMORIS BELGIUM	GENT - ZWIJNAARDE
BELGIUM	SCIENTIFIC INSTITUTE OF PUBLIC HEALTH	BRUSSELS
BELGIUM	LOVAP (LABORATORIUM VOOR ONDERZOEK VAN LEVENSMIDDELEN EN AANVERWANTE PRODUKTEN) NV	GEEL
BULGARIA	PRIMORIS - BULGARIA, PLOVDIV	PLOVDIV
CHINA	AGRO-PRODUCT SAFETY RESEARCH CENTER, CHINESE ACADEMY OF INSPECTION AND QUARANTINE	BEIJING
CHINA	SHANGHAI MUNICIPAL CENTER FOR DISEASE CONTROL AND PREVENTION	SHANGHAI
CHINA	INSPECTION AND QUARANTINE TECHNIQUE CENTER OF QINHUANGDAO ENTRY-EXIT INSPECTION AND QUARANTINE BUREAU OF P.R. CHINA	QINHUANGDAO
CHINA	BEIJING UNI-STAR INSPECTION TECHNOLOGY CO., LTD.	BEIJING
COSTA RICA	LABORATORIO DE RESIDUOS	SAN JOSÉ
CYPRUS	LABORATORY OF PESTICIDE RESIDUES ANALYSIS STATE GENERAL LABORATORY	NICOSIA
CZECH REPUBLIC	UNIVERSITY OF CHEMICAL TECHNOLOGY DEPT. OF FOOD CHEMISTRY AND ANALYSIS	PRAHA
CZECH REPUBLIC	CZECH AGRICULTURE AND FOOD INSPECTION AUTHORITY	PRAHA
DENMARK	NATIONAL FOOD INSTITUTE TECHNICAL UNIVERSITY OF DENMARK	SØBORG
FINLAND	FINNISH CUSTOMS LABORATORY	ESPOO
FRANCE	SERVICE COMMUN DES LABORATOIRES LABORATOIRE ILE DE FRANCE - MASSY	MASSY CEDEX
FRANCE	SERVICE COMMUN DES LABORATOIRES LABORATOIRE DE MONTPELLIER	MONTPELLIER
FRANCE	INOVALYS LE MANS	LE MANS
FRANCE	CERECO SUD	GARONS
FRANCE	ANSES - LSAL - UNITÉ PBM	MAISONS-ALFORT CEDEX
GERMANY	ILAU GMBH	ANZING
GERMANY	LANDWIRTSCHAFTLICHES TECHNOLOGIEZENTRUM AUGUSTENBERG	KARLSRUHE
GERMANY	LUFA-ITL GMBH	KIEL
GERMANY	CENTRAL INSTITUTE OF THE BUNDESWEHR MEDICAL SERVICE MUNICH	GARCHING
GERMANY	CHEMISCHES LABOR DR. MANG	FRANKFURT AM MAIN
GERMANY	FEDERAL OFFICE OF CONSUMER PROTECTION AND FOOD SAFETY	BERLIN
GERMANY	GALAB LABORATORY GMBH	HAMBURG
GERMANY	LABOR FRIEDLE GMBH	TEGERNHEIM
GERMANY	EUROFINS - DR. SPECHT LABORATORIEN GMBH	HAMBURG
GERMANY	LANDESAMT FÜR LANDWIRTSCHAFT, LEBENSMITTELSICHERHEIT UND FISCHEREI MECKLENBURG-VORPOMMERN	ROSTOCK
GERMANY	FOOD AND VETERINARY INSTITUTE OLDENBURG	OLDENBURG

ANNEX 1. List of Laboratories that participate in EUPT-FV-SM09

COUNTRY	LABORATORY NAME	CITY
GERMANY	CHEMICAL AND VETERINARY ANALYTICAL INSTITUTE RHINE-RUHR-WUPPER	KREFELD
GERMANY	BAVARIAN HEALTH AND FOOD SAFETY AUTHORITY OFFICE ERLANGEN	ERLANGEN
GERMANY	CHEMICAL AND VETERINARY INVESTIGATIONS OFFICE, STUTTGART (CVUAS)	FELLBACH
HUNGARY	NATIONAL FOOD CHAIN SAFETY OFFICE, FOOD CHAIN SAFETY CENTRE NON-PROFIT LTD., PESTICIDE RESIDUE ANALYTICAL LABORATORY, SZOLNOK	HÓDMEZOVÁSÁRHELY
HUNGARY	NATIONAL FOOD CHAIN SAFETY OFFICE, FOOD CHAIN SAFETY CENTRE NON-PROFIT LTD. PESTICIDE RESIDUE ANALYTICAL LABORATORY	SZOLNOK
HUNGARY	NATIONAL FOOD CHAIN SAFETY OFFICE, DIRECTORATE OF PLANT PROTECTION, SOIL CONSERVATION AND AGRI-ENVIRONMENT PESTICIDE ANALYTICAL LABORATORY	VELENCE
HUNGARY	NATIONAL FOOD CHAIN SAFETY OFFICE, FOOD CHAIN SAFETY CENTRE NON-PROFIT LTD. PESTICIDE RESIDUE ANALYTICAL LABORATORY	MISKOLC
IRELAND	PESTICIDE CONTROL LABORATORY, DEPARTMENT OF AGRICULTURE, FISHERIES AND FOOD	CO. KILDARE
ITALY	ISTITUTO ZOOPROFILATTICO SPERIMENTALE SICILIA	PALERMO
ITALY	PUBLIC HEALTH LABORATORY	FIRENZE
ITALY	APPA TRENTO SETTORE LABORATORIO	TRENTO
ITALY	ARPALAZIO SEZIONE P. LE DI LATINA - SERVIZIO LABORATORIO AMBIENTE E SALUTE UNITA` DI CHIMICA INORGANICA	LATINA
ITALY	ARPA FVG SETTORE LABORATORIO UNICO LABORATORIO DI PORDENONE	PORDENONE
ITALY	LABORATORIO ANALISI ACQUE E CROMATOGRAFIA	BOLZANO
ITALY	ATS CITTÀ METROPOLITANA DI MILANO LABORATORIO DI PREVENZIONE	MILANO
KENYA	SGS KENYA LABORATORY	MOMBASA
LATVIA	INSTITUTE OF FOOD SAFETY ANIMAL HEALTH AND ENVIRONMENT (BIOR	RIGA
NETHERLANDS	GROEN AGRO CONTROL	DELFGAUW
NETHERLANDS	EUROFINS LAB ZEEUWS-VLAANDEREN (LZV) B.V.	GRAAUW
NETHERLANDS	NVWA - NETHERLANDS FOOD AND CONSUMER PRODUCT SAFETY AUTHORITY	WAGENINGEN
NETHERLANDS	RIKILT - WAGENINGEN UNIVERSITY & RESEARCH	WAGENINGEN
NORWAY	NORWEGIAN INSTITUTE FOR AGRICULTURAL AND ENVIRONMENTAL RESEARCH, PLANT HEALTH AND PLANT PROTECTION DIVISION, PESTICIDE CHEMISTRY SECTION	AAS
POLAND	UO-TECHNOLOGIA LABORATORIUM GRÓJEC	GRÓJEC
SERBIA	CENTER FOR FOOD ANALYSIS	BELGRADE
SLOVENIA	NATIONAL LABORATORY OF HEALTH, ENVIRONMENT AND FOODSTUFFS	MARIBOR
SPAIN	EUROFINS SICA AGRIQ S.L.	ALMERIA
SPAIN	LABORATORIO AGROALIMENTARIO DE EXTREMADURA	CÁCERES
SPAIN	LABORATORIO AGROALIMENTARIO Y DE SANIDAD ANIMAL DE MURCIA	MURCIA
SPAIN	AGROFOOD LABORATORY OF THE COMUNIDAD VALENCIANA	VALENCIA
SPAIN	LABORATORIO DE PRODUCCIÓN Y SANIDAD VEGETAL DE JAÉN	MENGIBAR (JAÉN)

ANNEX 1. List of Laboratories that participate in EUPT-FV-SM09.

COUNTRY	LABORATORY NAME	CITY
SPAIN	ANALYTICA ALIMENTARIA GMBH SUCURSAL ESPAÑA	ALMERIA
SPAIN	LABORATORIO DE PRODUCCIÓN Y SANIDAD VEGETAL DE ALMERÍA, MINISTRY OF AGRICULTURE	LA MOJONERA (ALMERIA)
SPAIN	LABORATORIOS ECOSUR, S.A.L.	LORQUÍ (MURCIA)
SPAIN	NATIONAL CENTRE FOR TECHNOLOGY AND FOOD SAFETY (CNTA)	SAN ADRIÁN (NAVARRA)
SPAIN	SOIVRE	VALENCIA
SPAIN	LABORATORI AGROALIMENTARI DE LA GENERALITAT DE CATALUNYA	CABRILS
SWEDEN	EUROFINS - FOOD&AGRO SWEDEN	LIDKÖPING
SWEDEN	NATIONAL FOOD AGENCY, CHEMISTRY DEPARTMENT	UPPSALA
SWITZERLAND	KANTONALES LABORATORIUM ZÜRICH	ZÜRICH
TURKEY	ÖZEL MSM GIDA KONTROL LAB. VE DAN. HIZ. TIC. AS. (PRIVATE MSM FOOD CONTROL LABORATORY)	MERSIN
UNITED KINGDOM	EUROFINS FOOD TESTING	WOLVERHAMPTON
UNITED KINGDOM	SCIENTIFIC ANALYSIS LABORATORIES	CAMBRIDGE
UNITED KINGDOM	FERA SCIENCE LIMITED	YORK
ZAMBIA	ZAMBIA BUREAU OF STANDARDS	LUSAKA