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Перевірка  
професійного рівня



**PROFICIENCY TESTING PT.UA.6.2.2017  
ORGANOPHOSPHORUS PESTICIDES  
IN FEEDING STUFFS AND FOOD PRODUCTS  
OF PLANT ORIGIN  
PROFICIENCY TESTING REPORT  
ROUND 9 APRIL 2026**

Report prepared by:	Volodymyr Novikov
Date:	24.04.2026
Contact:	<a href="mailto:vovan.novikov@gmail.com">vovan.novikov@gmail.com</a>

Report approved by:	Nataliia Bozhko
Date:	24.04.2026
Contact:	<a href="mailto:pt.smetrology@gmail.com">pt.smetrology@gmail.com</a>
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## 2. SUMMARY.

2.1. The purpose of proficiency testing in pesticides testing is to demonstrate the laboratory's competence (as described in ISO/IEC 17043:2023[1]) and improve the reliability of test results.

2.2. This proficiency testing involves the use of inter-laboratory comparisons to confirm the performance of individual laboratories' abilities and/or identify areas of improvement.

2.3. This is the final report on the PT.UA.6.2.2017 Round 9 held in March-April 2026. This report is issued according to ISO/IEC 17043[1] and PT.UA.6.2.2017 Round 9 Programme. The report is issued in two languages – Ukrainian and English. English should be considered as the basic language of the report. Both versions of this report can be found at: <http://www.metrologyservice.com.ua>

2.4. A total of 10 participants have reported. Their results are presented in the next clauses.

2.5. Technical experts list and/or subcontractors for this round can be provided to the Participant by request.

2.6. Any calculations, formulas, raw and intermediate data used in this round can be provided to the Participant by request, except confidential information about other participants and information that may contain commercial secret.

2.7. If the Participant does not agree with the proficiency testing results or has any comments on the Provider's work, one can submit a complaint or appeal within 10 days. More information on the complaint procedure can be found at <https://www.metrologyservice.com.ua/> or by contacting the Provider.

2.8. The Provider declares that all results presented in this report are confidential. Each participant is identified by a unique number assigned to them based on their registration application for each round of the program separately. This number is confidential information and may only be disclosed at the participant's request

2.9. Where applicable, the metrological traceability of assigned values is ensured, as confirmed by the use of measurement equipment properly calibrated in accordance with current EA and NAAU policies.

2.10. The uncertainty of the assigned values (for quantitative evaluation) may be provided upon the participant's request.

2.11. All users of this report are prohibited from copying or reproducing it, in whole or in part, without the written consent of the Provider.

2.8. Provider is accredited by NAAU in accordance with the requirements of ДСТУ EN ISO/IEC 17043:2017. The list of parameters is specified in the scope of accreditation, which can be found on the website <https://www.metrologyservice.com.ua/> or obtained upon request from the Provider.

2.9. Clause 13 of this report is for information purposes only. Data is taken from voluntary part of the Participants' reports. Provider did not assess any results bases in this data.

### **3. GENERAL PROTOCOL FOR PROFICIENCY TESTING**

#### **3.1. MANAGEMENT SYSTEM.**

3.1.1. The functioning management system of Metrology Service Ltd. (further - Provider) complies with ISO/IEC 17043[1] requirements and covers all aspects of proficiency testing (further - PT) for all proficiency tests.

#### **3.2. SAMPLES PREPARATION, HOMOGENITY AND STABILITY**

3.2.1. Provider has used III 7.3.1 procedure and appropriate technical experts and contractors for the samples' selection, production, homogenization and division designs that is proved to be satisfactory for the purposes of PT programme PT.UA.6.2.2017 Round 9. Details of test material preparation and homogenization are not published in the report, though can be provided to the Participant by request. Tests, required to prove (validate) homogeneity and stability of samples were performed by competent contracting laboratories according to [1]. These results with statistics are published in the report.

3.2.2. Participants may contact the Provider to request details of test material selection, preparation, homogenization and division of those test material samples, for which they tested in PT. Such information can be provided to the Participant in confidence and only if it cannot compromise other Participants and/or is not a commercial secret.

3.2.3. During sample preparation, all necessary procedures (where applicable) were performed, such as the removal of impurities. A sample preparation report can be provided upon request..

#### **3.3. DISPATCH AND RECEIPT OF SAMPLES**

3.3.1. Samples of test material (Sample A, Sample B and Sample C (blank)) – **milled wheat** were dispatched 02.03.2026 according to schedule of proficiency testing programme PT.UA.6.2.2017 Round 9.

3.3.2. Each produced and identified sample was sealed in a plastic foil bag.

3.3.3. A total of 10 participants from **three countries** received three samples (sample A, sample B and sample C) each. Results were returned from 10 participants.

3.3.4. The samples were shipped to participants via the commercial delivery service “Nova Poshta” LLC (or another option).

#### **3.4. FOLLOW-UP SERVICES**

3.4.1. If a participant wishes to obtain advice/consultation on any aspect of their performance, one should contact the Provider. Provider can (with agreement with Participant) pass on the Participant's inquiry to a technical expert and/or contracting laboratory.

3.4.2. Surplus samples from this round are available for sale as certified reference materials (CRM) with the certified values and uncertainties. Please email Provider for details.

#### **3.5. PERFORMANCE ASSESMENT**

3.5.1. Provider expressed Participant's results as traditional z-scores according to [1].

3.5.2. The assigned value for each analyte was calculated as the robust mean of the trial data using Huber H15 method [2] or Algorithm A variation, Annex C.3 [4].

3.5.3 The target standard deviation for each analyte was chosen from European Union Reference Laboratories practice [8] as 25% of the assigned value.

3.5.4. z-Scores were deemed satisfactory if  $|z| \leq 2$ . z-Scores were deemed questionable if  $2 < |z| \leq 3$  (marked yellow in tables). If  $|z| > 3$ , the results were considered to be unsatisfactory (marked red in tables). The calculations were made according to [1,3,5,8]. Provider recommends corrective actions if  $|z| > 3$  and preventive actions if  $2 < |z| \leq 3$ .

In this round, for quantitative methods 10,62 % (12 results) of all results were considered to be unsatisfactory. In the round 8 for quantitative methods 12,40 % (15 results) of all results were considered to be unsatisfactory.

3.5.5. For Sample A and Sample B for targeted pesticide list that were reported as “less than detection limit” or “less than reporting limit of laboratory” and were not spiked are considered to be satisfactory (S) by the Provider. False positive or false negative results are considered to be not satisfactory (NS) by the Provider.

In this round for qualitative methods all results were considered to be «Satisfactory (S)». In the Round 8 5,19% (11 results) of all results were considered to be «Unsatisfactory (NS)».

3.5.6. Participant №2 provided results for: Sample A for «Fenitrothion, mg/kg» as «<0,01». Due to the chosen PT standard deviation this result was assessed by the Provider as «Unsatisfactory (NS)».

and Sample B for «Fenitrothion, mg/kg» as «<0,01». Due to the chosen PT standard deviation this result was assessed by the Provider as «questionable Satisfactory (S\*)».

3.5.7. Participant №4 provided results for: Sample A «Ethion, mg/kg», «Monocrotophos, mg/kg» as «ND\*». Due to the chosen PT standard deviation and the limit of quantification «0.05» and the limit of detection «0.02» stated by the participant, these results were assessed by the Provider as «Unsatisfactory (NS)».

Sample B «Monocrotophos, mg/kg» LOD 0,02 mg/kg, LOQ 0,05 mg/kg; «Fenitrothion, mg/kg» LOD 0,05 mg/kg, LOQ 0,1 mg/kg «Pirimiphos-methyl, mg/kg» LOD 0,02 mg/kg, LOQ 0,05 mg/kg, as «ND\*». Due to the chosen PT standard deviation and the limit of quantification and the limit of detection stated by the participant, these results were assessed by the Provider as «Satisfactory (S)».

Sample B «Ethion, mg/kg» LOD 0,02 mg/kg, LOQ 0,05 mg/kg» as «ND\*». Due to the chosen PT standard deviation and the limit of quantification and the limit of detection stated by the participant, this result was assessed by the Provider as «questionable Satisfactory (S\*)».

3.5.8. Participant №5 provided result for Sample B for «Chlorpyrifos-methyl, mg/kg» as «<0,01». Due to the chosen PT standard deviation this result was assessed by the Provider as «questionable Satisfactory (S\*)».

3.5.9. Participant №6 provided results for Sample B for: «Chlorpyrifos, mg/kg», «Chlorpyrifos-methyl, mg/kg», «Fenitrothion, mg/kg», «Malathion, mg/kg», «Pirimiphos-methyl, mg/kg» as «<0,02». Due to the chosen PT standard deviation and the limit of quantification «<0.02» stated by the participant, these results were assessed by the Provider as «Satisfactory (S)».

3.5.10. Participant №10 provided results for Sample A and Sample B: «Chlorpyrifos, mg/kg» «Fenitrothion, mg/kg» as «виявлено». Due to the chosen PT standard deviation these results were assessed by the Provider as «Satisfactory (S)».

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\* ND – Not detected

#### 4. HOMOGENEITY AND STABILITY ASSESMENT

4.1. Samples A and Samples B were assessed for homogeneity after blending and packing by selecting three samples of material at random from all those produced. These samples were tested in duplicate under repeatability conditions as only 18 of samples were produced according to [7]. Sample C was tested for the absence of target pesticides.

4.2. Statistical analysis of the resulting data for homogeneity and stability was carried out using the industry standard Cochran's 'C' test and analytical variance test for 'sufficient homogeneity' according to [3] or Annex B.2[4].

4.3. Produced samples were found to be sufficiently homogeneous and stable for all spiked pesticides. Results of homogeneity are without recovery.

4.4. Full work example of «Chlorfenvinphos, mg/kg» (Sample A):

Chlorfenvinphos, mg/kg												
Дослідження гомогенності/Homogeneity test						Аналіз на 'достатню однорідність'/Test for 'sufficient homogeneity'						
Аналіз викидів за тестом Кохрана(C -тест)/Cohran's C test for outliers												
Номер зразку/ Sample number	Результат/ Result A	Результат/ Result B	Average	SD <sup>2</sup>	0,00	Номер зразку /Sample number	Результат/ Result A	Результат/ Result B	SUM	Difference <sup>2</sup>		
1	0,035	0,035	0,035	0,0000	0,00	1	0,04	0,04	0,07	0,0000		
2	0,030	0,033	0,032	0,0000	0,00	2	0,03	0,03	0,06	0,0000		
3	0,032	0,030	0,031	0,0000	0,00	3	0,03	0,03	0,06	0,0000		
											0,0000	
Mean	0,033		Worst pair	0,0000		Mean	0,033					
Max	0,04		SUM of SD <sup>2</sup>	0,0000		Max	0,04					
Min	0,03		C	0,6923		Min	0,03					
			Ccr, 5%	0,9669								
			Ccr, 1%	0,9933		Analytical variance S <sup>2</sup> an	0,0000	SD	0,0023			
			Conclusion			Sanal	0,0015	RSDR	6,9487			
			5% PASS			Ssums	0,0000					
			1% PASS			MSb	0,0000					
						Between sample variance S <sup>2</sup> sam	0,0000					
Remarks												
1. Cochran's C test is described in ISO 5727-2 and ISO 13528:2022												
2. Test for 'sufficient homogeneity' is performed according to Annex B ISO 13528:2022												

Source of $\sigma_p$ value to use		
Use(write '1')	Source	$\sigma_p$
	C>13.8%, HORWITZ	1,8028
	120ppb<C<13.8%, HORWITZ	0,0087
1	C<120 ppb	0,0072
MASS NEGATIVE POWER FOR HORWITZ EQUATION(%=2, ppb=9,ppm=6)		
	SD	0,0021
	Trial SD	0,0150
	Target SD chosen	0,0072
	$\sigma^2$ all	0,000005
	Replicates	3
	F1	2,996
	F2	4,276
	Critical value	0,000023
	Between sample variance S <sup>2</sup> sam	0,000004
	Sufficient homogeneity test	PASS

#### 4.5. Data for all spiked pesticides Sample A:

	Chlorfenvinphos, mg/kg	Chlorpyrifos, mg/kg	Chlorpyrifos- methyl, mg/kg	Ethion, mg/kg	Fenitrothion, mg/kg	Malathion, mg/kg	Monocrotophos, mg/kg	Pirimiphos-methyl, mg/kg
<b>Homogeneity and stability (Гомогенність та стабільність)</b>								
<b>Cohran's 'C' test (С-тест "Кохрана")</b>								
Critical value (5%,3pairs)=0,9669	0,6923	0,8333	0,5246	0,8182	0,5902	0,5294	0,6154	0,3902
Mean Result	0,0325	0,0410	0,0563	0,0508	0,0578	0,0418	0,0747	0,0438
Conclusion (Висновок)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
<b>Analytical variance test (тест аналітичної дисперсії)</b>								
S <sup>2</sup> anal	0,000002	0,00001	0,00002	0,000002	0,00001	0,000003	0,000004	0,00001
Sanal	0,00147	0,00224	0,00451	0,0014	0,00320	0,0017	0,0021	0,0026
S <sup>2</sup> sample	0,00000	0,00000	0,00000	0,0000	0,00000	0,0000	0,0000	0,0000
σ <sub>p</sub>	0,00715	0,00902	0,01239	0,0112	0,01272	0,0092	0,0164	0,0096
σ <sub>p</sub> source	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz
σ <sup>2</sup> all	0,000005	0,00001	0,00001	0,00001	0,00001	0,00001	0,00002	0,00001
Critical value	0,000023	0,00004	0,00013	0,00004	0,00009	0,00003	0,00009	0,00005
Conclusion (Висновок)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

#### 4.6. Data for all spiked pesticides Sample B:

	Chlorfenvinphos, mg/kg	Chlorpyrifos, mg/kg	Chlorpyrifos- methyl, mg/kg	Ethion, mg/kg	Fenitrothion, mg/kg	Malathion, mg/kg	Monocrotophos, mg/kg	Pirimiphos-methyl, mg/kg
<b>Homogeneity and stability (Гомогенність та стабільність)</b>								
<b>Cohran's 'C' test (С-тест "Кохрана")</b>								
Critical value (5%,3pairs)=0,9669	0,6667	0,8000	0,5000	0,4091	0,9000	0,6667	0,4444	0,6667
Mean Result	0,0110	0,0103	0,0100	0,0190	0,0103	0,0133	0,0165	0,0163
Conclusion (Висновок)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
<b>Analytical variance test (тест аналітичної дисперсії)</b>								
S <sup>2</sup> anal	0,000001	0,000003	0,000001	0,000004	0,000002	0,000001	0,000002	0,000001
Sanal	0,0010	0,0018	0,0012	0,0019	0,0013	0,0010	0,0012	0,0010
S <sup>2</sup> sample	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
σ <sub>p</sub>	0,0024	0,0023	0,0022	0,0042	0,0023	0,0029	0,0036	0,0036
σ <sub>p</sub> source	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz
σ <sup>2</sup> all	0,000001	0,000001	0,000004	0,000002	0,000001	0,000001	0,000001	0,000001
Critical value	0,000006	0,000016	0,0000070	0,000020	0,000009	0,000007	0,000010	0,000008
Conclusion (Висновок)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

## 5. DATA SUMMARY FOR SPIKED PESTICIDES – SAMPLE A

	Chlorfenvinphos, mg/kg	Chlorpyrifos, mg/kg	Chlorpyrifos-methyl, mg/kg	Ethion, mg/kg	Fenitrothion, mg/kg	Malathion, mg/kg	Monocrotophos, mg/kg	Pirimiphos-methyl, mg/kg
No of Results	5	10	8	6	7	8	5	7
No of Results  z >3 or NS	1	0	1	1	1	1	1	1
No of Results  z >3, % or NS,%	20,000	0,000	12,500	16,667	14,286	12,500	20,000	14,286
Mean	0,162	0,044	0,088	0,049	0,064	0,038	0,088	0,066
Min	0,038	0,030	0,030	0,027	0,038	0,010	0,049	0,028
Max	0,640	0,067	0,324	0,060	0,087	0,074	0,131	0,191
SD	0,267	0,010	0,096	0,013	0,021	0,018	0,034	0,056
Median	0,042	0,045	0,057	0,051	0,068	0,035	0,086	0,046
Robust mean (assigned value)	0,043	0,043	0,054	0,051	0,064	0,034	0,088	0,044
Robust SD	0,006	0,004	0,008	0,007	0,021	0,009	0,034	0,010
Spiked level	0,050	0,055	0,065	0,060	0,070	0,045	0,080	0,055
Recovery, %	86,050	78,984	83,148	85,437	91,629	76,533	110,179	80,000
SD from method (Tr.SD)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SD from Horwitz eq.	0,009	0,010	0,012	0,011	0,014	0,008	0,019	0,010
Target SD	0,011	0,011	0,014	0,013	0,016	0,009	0,022	0,011
Source of target SD of PT	EURL	EURL	EURL	EURL	EURL	EURL	EURL	EURL

## SAMPLE B

	Chlorfenvinphos, mg/kg	Chlorpyrifos, mg/kg	Chlorpyrifos-methyl, mg/kg	Ethion, mg/kg	Fenitrothion, mg/kg	Malathion, mg/kg	Monocrotophos, mg/kg	Pirimiphos-methyl, mg/kg
No of Results	5	10	8	6	7	8	5	8
No of Results  z >3 or NS	1	1	2	0	0	1	0	0
No of Results  z >3, % or NS,%	20,000	10,000	25,000	0,000	0,000	12,500	0,000	0,000
Mean	0,094	0,016	0,059	0,022	0,015	0,020	0,020	0,019
Min	0,015	0,009	0,009	0,017	0,014	0,010	0,012	0,014
Max	0,385	0,033	0,269	0,025	0,017	0,063	0,028	0,027
SD	0,163	0,008	0,104	0,003	0,002	0,019	0,007	0,005
Median	0,021	0,014	0,013	0,023	0,014	0,014	0,021	0,018
Robust mean (assigned value)	0,021	0,013	0,011	0,022	0,015	0,013	0,020	0,018
Robust SD	0,008	0,003	0,002	0,003	0,002	0,002	0,007	0,003
Spiked level	0,020	0,015	0,010	0,025	0,015	0,015	0,020	0,020
Recovery, %	105,000	88,846	112,500	87,200	100,000	84,444	102,321	90,870
SD from method (Tr.SD)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SD from Horwitz eq.	0,005	0,003	0,002	0,005	0,003	0,003	0,005	0,004
Target SD	0,005	0,003	0,003	0,005	0,004	0,003	0,005	0,005
Source of target SD of PT	EURL	EURL	EURL	EURL	EURL	EURL	EURL	EURL

## 6. RAW DATA FOR SPIKED PESTICIDES SAMPLE A

Laboratory number	Chlorfenvinphos, mg/kg	Chlorpyrifos, mg/kg	Chlorpyrifos-methyl, mg/kg	Ethion, mg/kg	Fenitrothion, mg/kg	Malathion, mg/kg	Monocrotophos, mg/kg	Pirimiphos-methyl, mg/kg
1	-	0,046	-	-	-	0,034	-	-
2	0,041	0,044	0,048	0,051	< 0,01	0,035	0,049	0,040
3	0,042	0,045	0,058	0,060	0,068	0,049	0,084	0,042
4	0,640	0,045	0,324	ND	0,087	0,074	ND	0,191
5	не досліджували	0,045	0,050	0,055	не досліджували	0,010	0,089	0,048
6		0,0299	0,0296		0,0377	0,0262		0,0275
7	0,038	0,067	0,081	0,027	0,080	0,035	не визначався	0,068
8		0,0350	0,0550					
9	0,0511	0,042	0,059	0,050	0,048	0,042	0,131	0,046
10		виявлено			виявлено			

## SAMPLE B

Laboratory number	Chlorfenvinphos, mg/kg	Chlorpyrifos, mg/kg	Chlorpyrifos-methyl, mg/kg	Ethion, mg/kg	Fenitrothion, mg/kg	Malathion, mg/kg	Monocrotophos, mg/kg	Pirimiphos-methyl, mg/kg
1	-	0,009	-	-	-	0,011	-	0,020
2	0,016	0,013	0,012	0,020	< 0,01	0,011	0,012	0,015
3	0,015	0,013	0,009	0,025	0,014	0,014	0,019	0,014
4	0,385	0,033	0,269	ND	ND	0,063	ND	ND
5	не досліджували	0,015	<0,01	0,024	не досліджували	0,010	0,023	0,018
6		<0,02	<0,02		<0,02	<0,02		<0,02
7	0,032	0,021	0,014	0,017	0,017	0,015	не визначався	0,027
8		0,0110	0,0370					
9	0,021	0,015	0,010	0,023	0,014	0,015	0,028	0,019
10		виявлено			виявлено			

### Remarks

1. Blank cell, «-», «не досліджували», «не визначався» – results were reported as “not tested” by the Participants.

## 7. Z SCORES FOR SPIKED PESTICIDES

### SAMPLE A

Laboratory number	Chlorfenvinphos, mg/kg	Chlorpyrifos, mg/kg	Chlorpyrifos-methyl, mg/kg	Ethion, mg/kg	Fenitrothion, mg/kg	Malathion, mg/kg	Monocrotophos, mg/kg	Pirimiphos-methyl, mg/kg
1		0,24				-0,05		
2	-0,19	0,05	-0,45	-0,02	NS	0,07	-1,78	-0,36
3	-0,10	0,14	0,29	0,68	0,24	1,69	-0,19	-0,18
4	55,50	0,14	19,98	NS	1,43	4,59	NS	13,36
5		0,13	-0,28	0,30		-2,79	0,02	0,36
6		-1,25	-1,81		-1,65	-0,96		-1,50
7	-0,47	2,17	1,99	-1,89	0,99	0,07		2,18
8		-0,78	0,07					
9	0,75	-0,13	0,37	-0,10	-1,01	0,88	1,94	0,18
10		S			S			

### SAMPLE B

Laboratory number	Chlorfenvinphos, mg/kg	Chlorpyrifos, mg/kg	Chlorpyrifos-methyl, mg/kg	Ethion, mg/kg	Fenitrothion, mg/kg	Malathion, mg/kg	Monocrotophos, mg/kg	Pirimiphos-methyl, mg/kg
1		-1,30				-0,53		0,40
2	-0,95	-0,10	0,27	-0,33	S*	-0,53	-1,65	-0,70
3	-1,14	-0,10	-0,80	0,59	-0,27	0,42	-0,29	-0,92
4	69,33	5,90	91,64	S*	S	15,89	S	S
5		0,39	S*	0,40		-0,84	0,47	-0,09
6		S	S		S	S		S
7	2,10	2,30	0,98	-0,88	0,53	0,74		1,94
8		-0,70	9,16					
9	0,00	0,50	-0,44	0,22	-0,27	0,74	1,47	0,18
10		S			S			

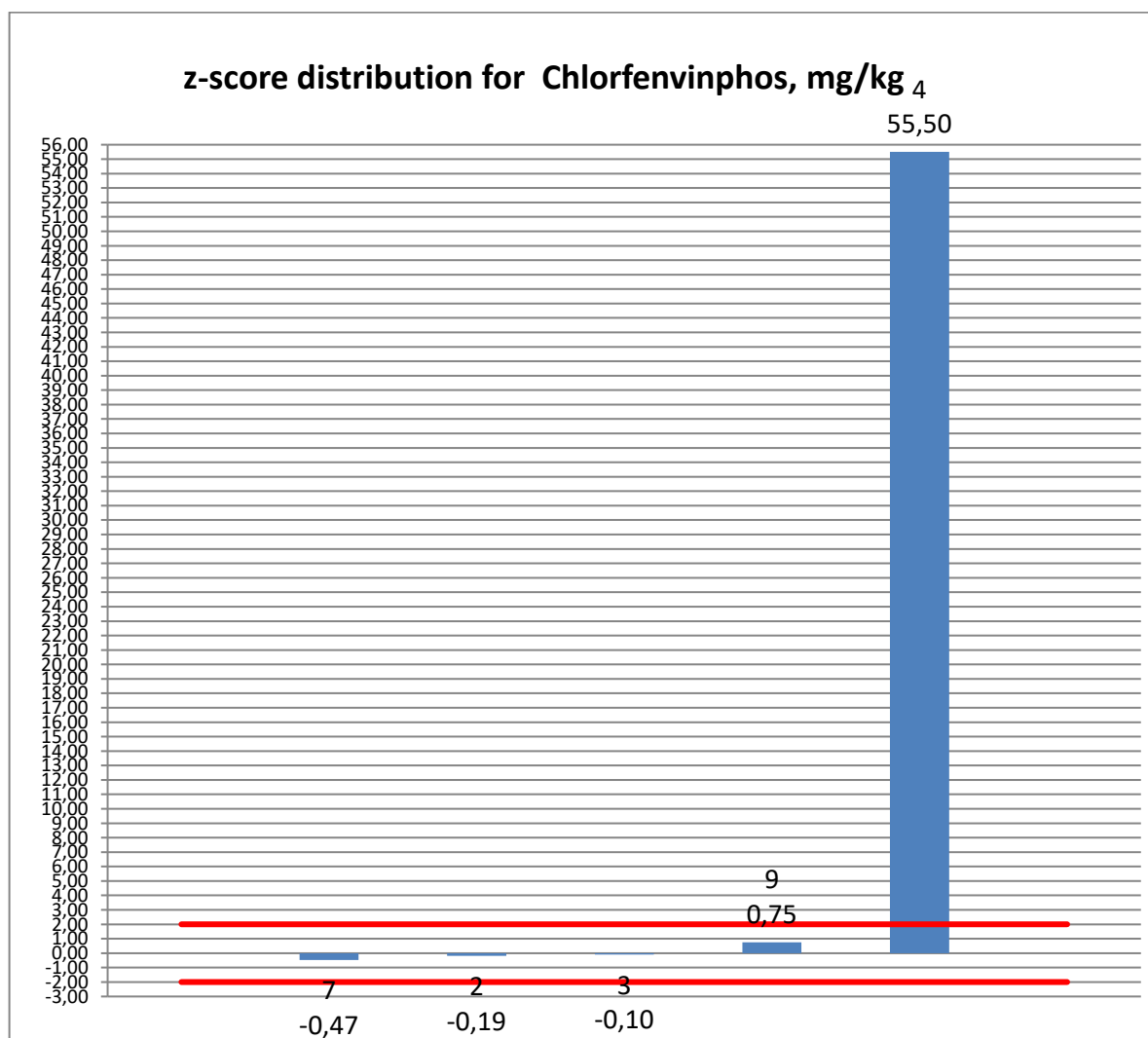
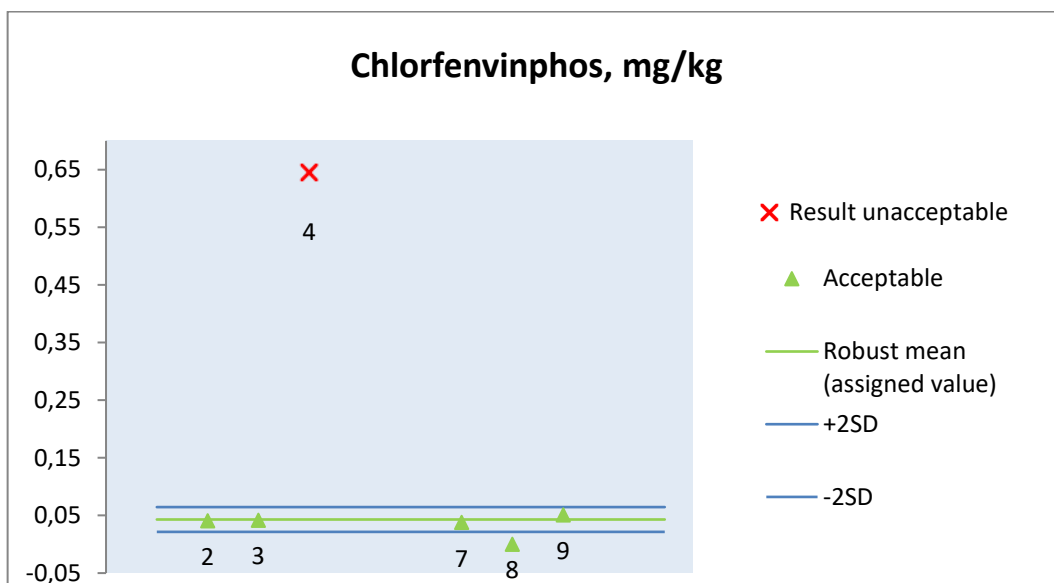
\*questionable result

#### Remarks

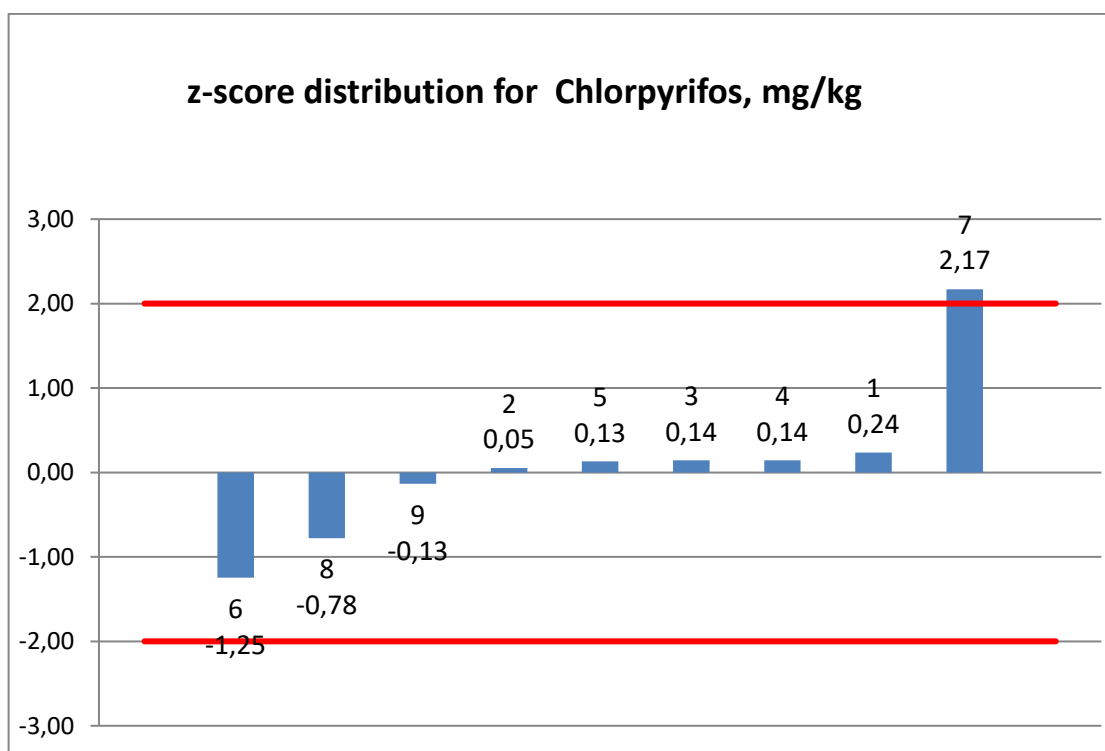
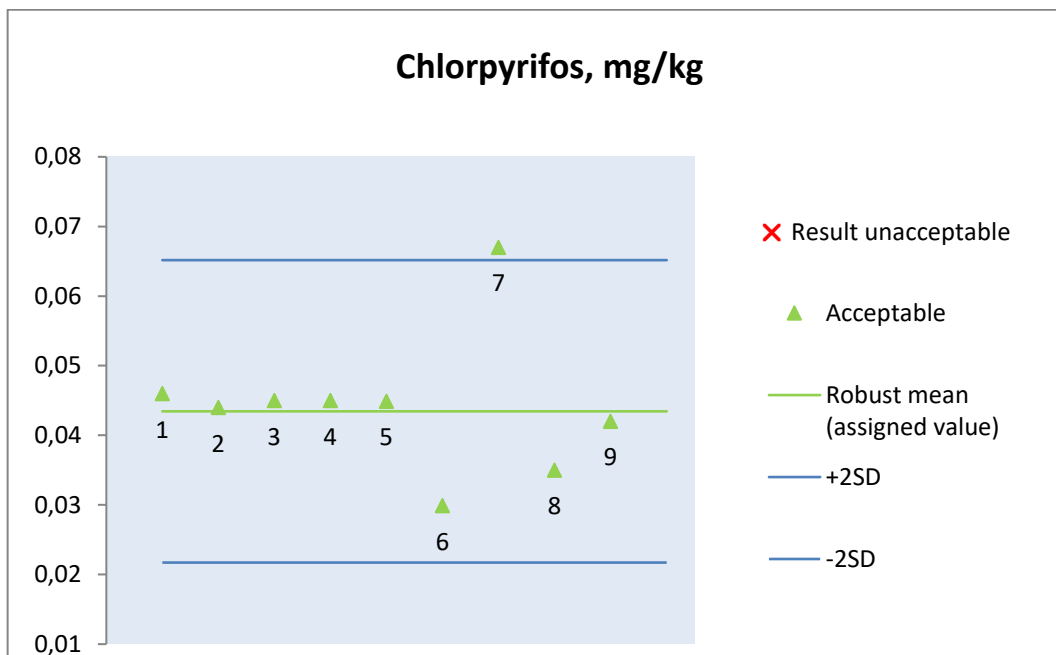
1. Green colored cells contain results that are considered to be satisfactory.
2. Red colored cells contain results that are considered to be not satisfactory.
3. Results that are considered to be questionable are marked by yellow colored cell.
4. Blank cell – results were not reported by the Participant

## 8. Z SCORE PLOTS AND RESULTS CHARTS FOR SPIKED PESTICIDES – SAMPLE A

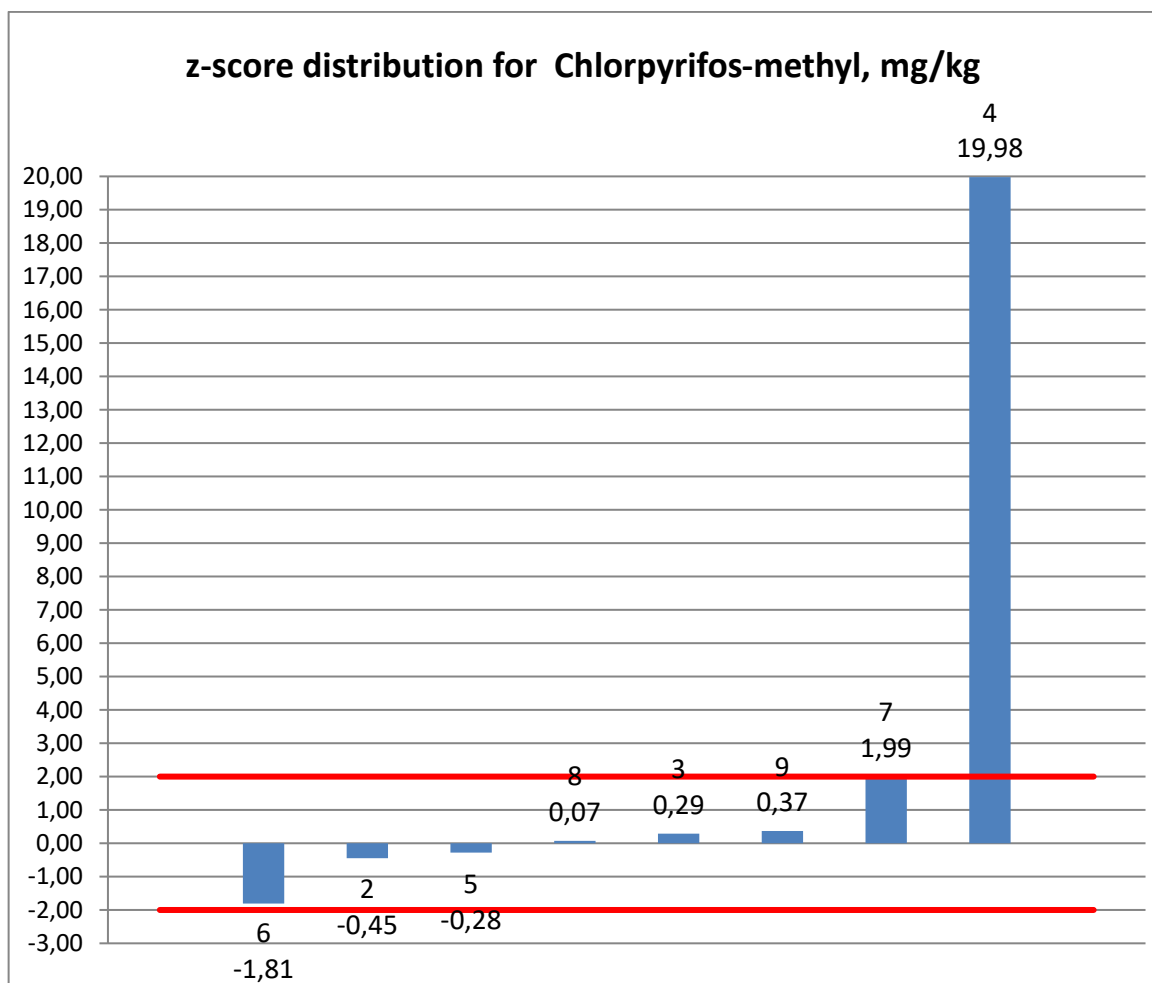
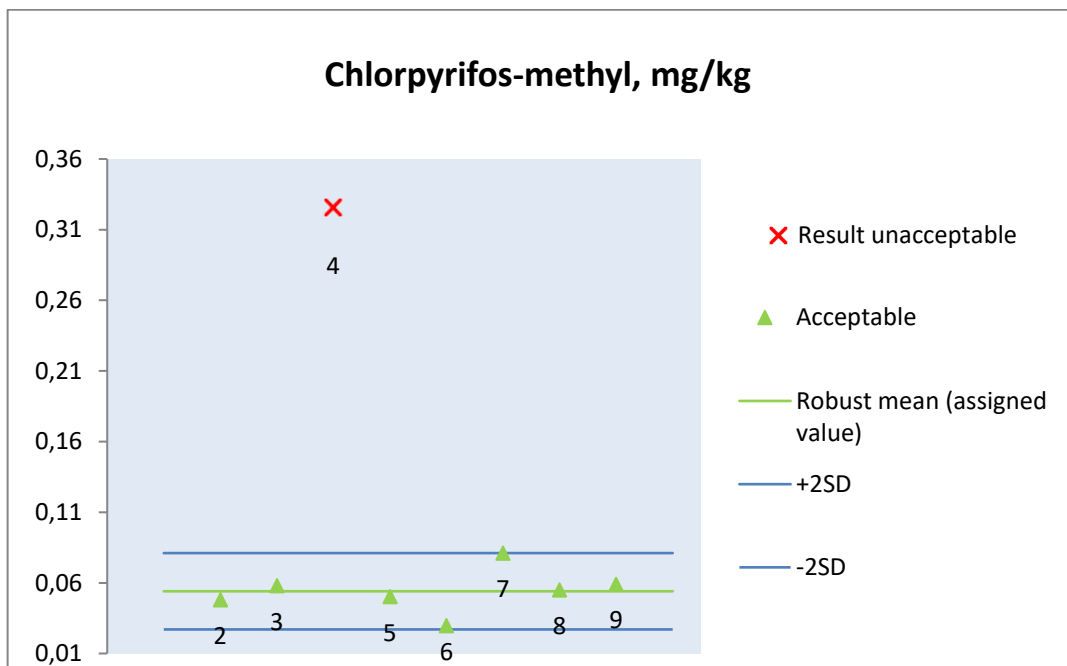
### 8.1. Chlorfenvinphos, mg/kg



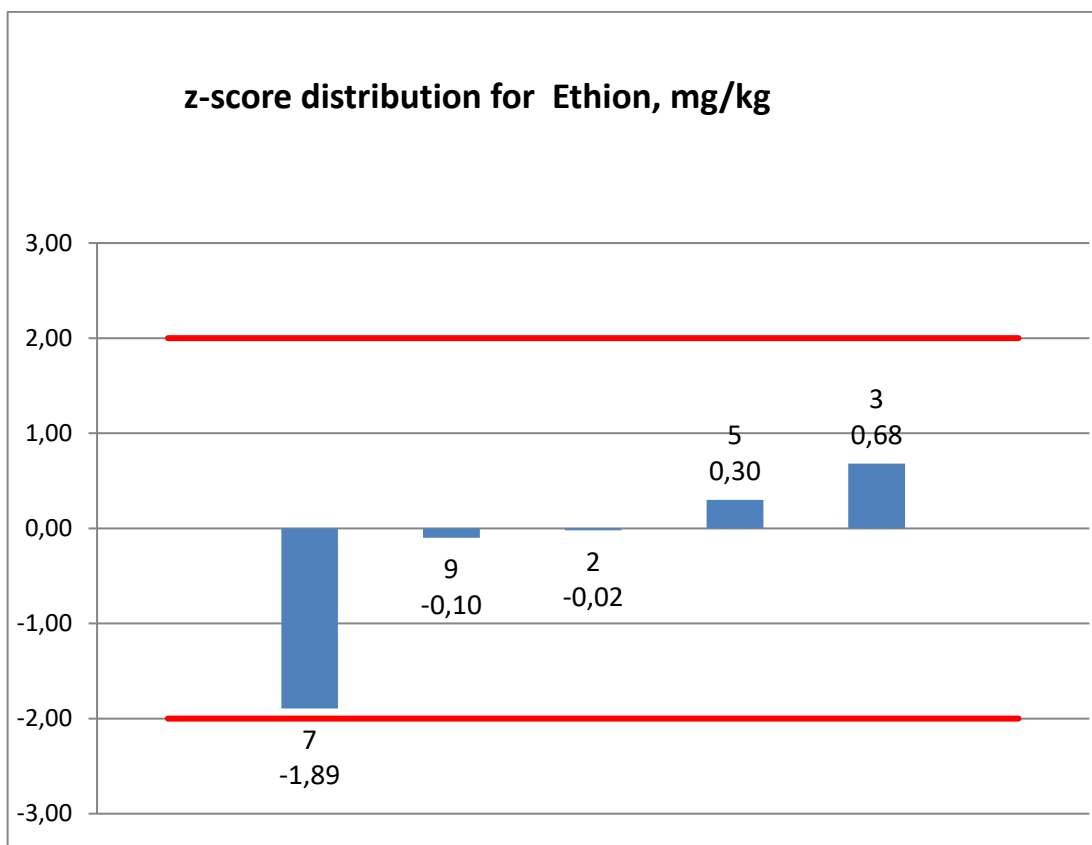
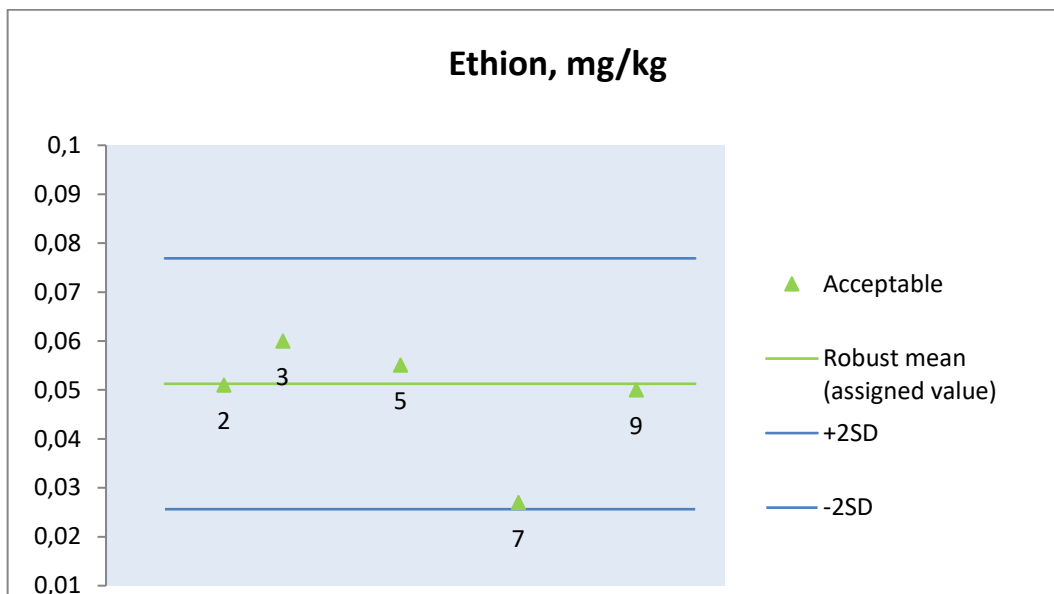
## 8.2. Chlorpyrifos, mg/kg



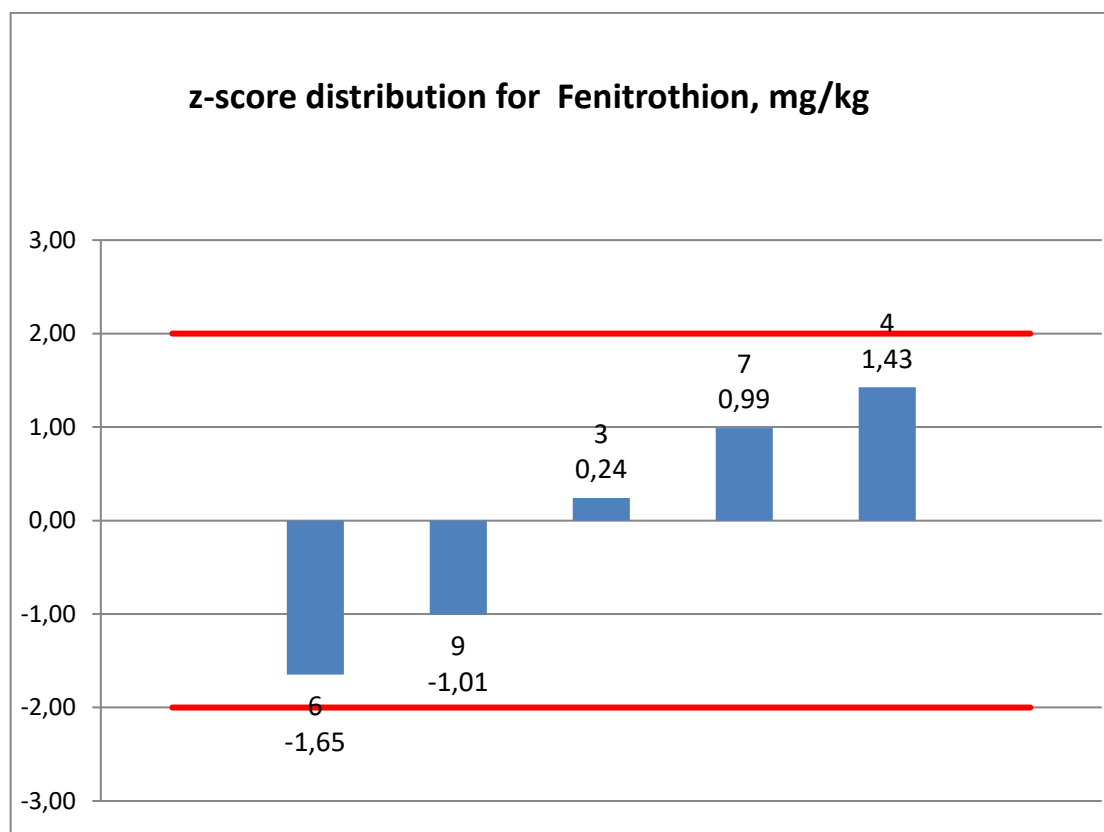
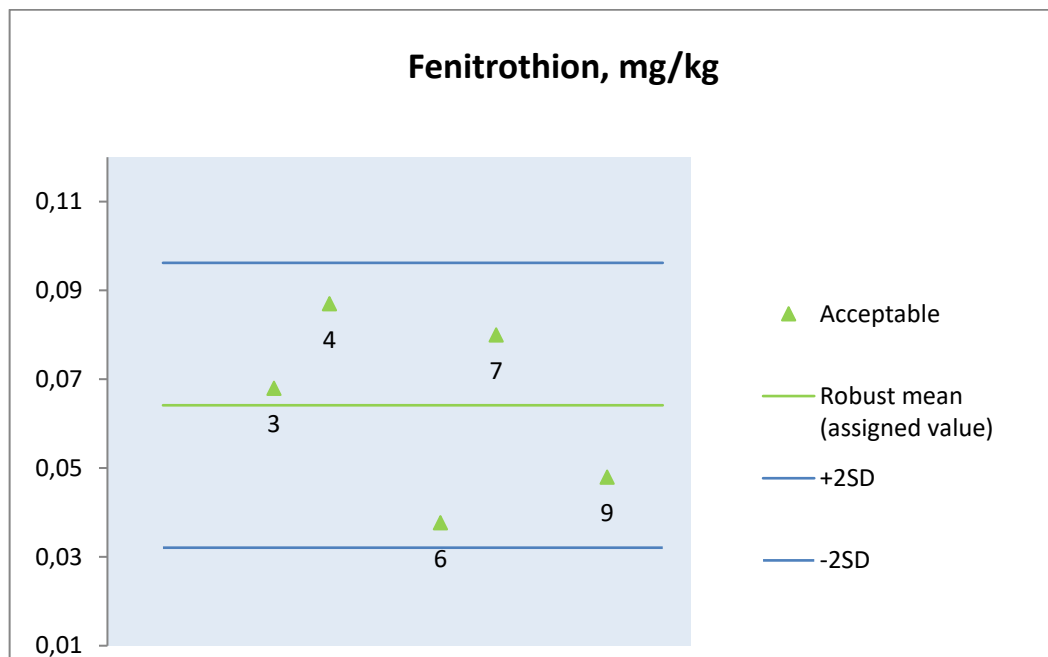
### 8.3. Chlorpyrifos-methyl, mg/kg



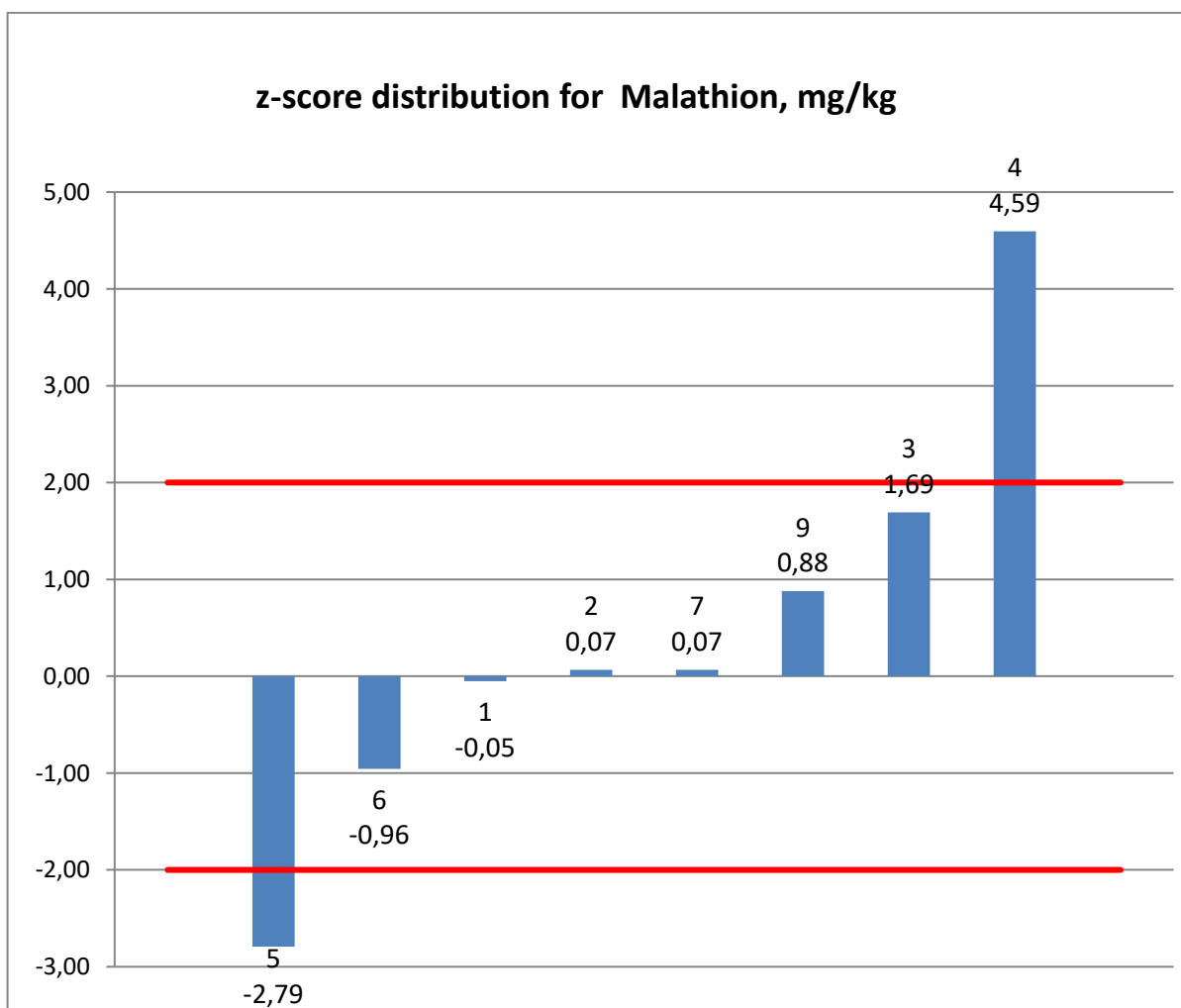
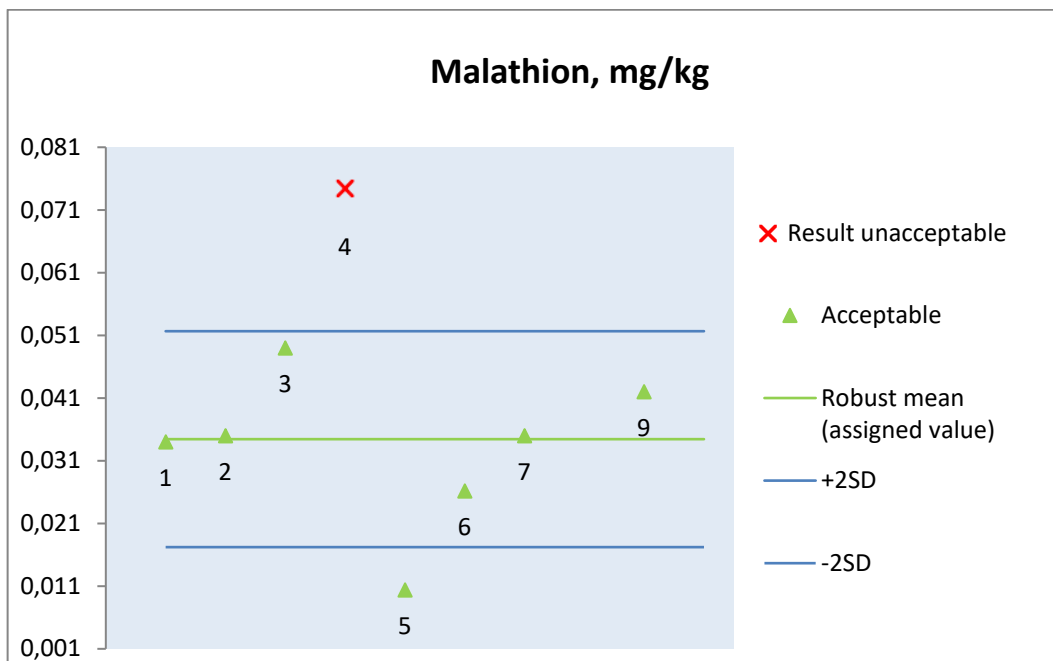
### 8.4. Ethion, mg/kg



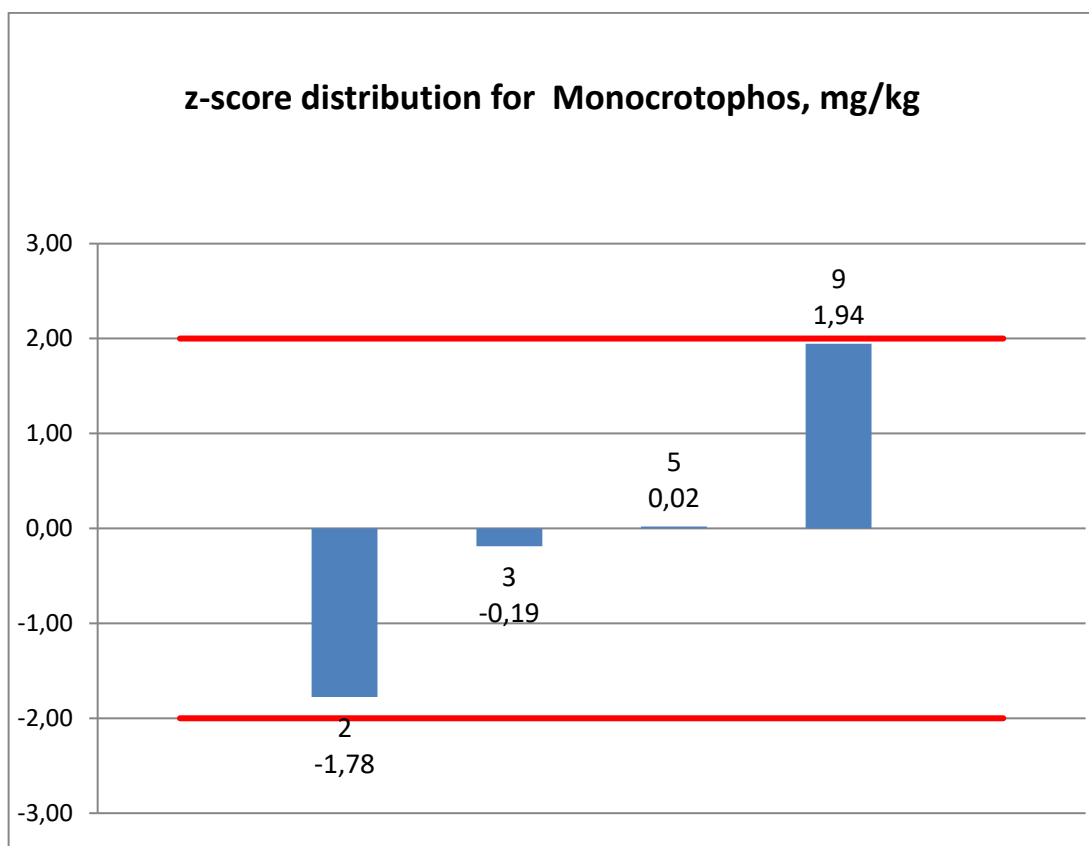
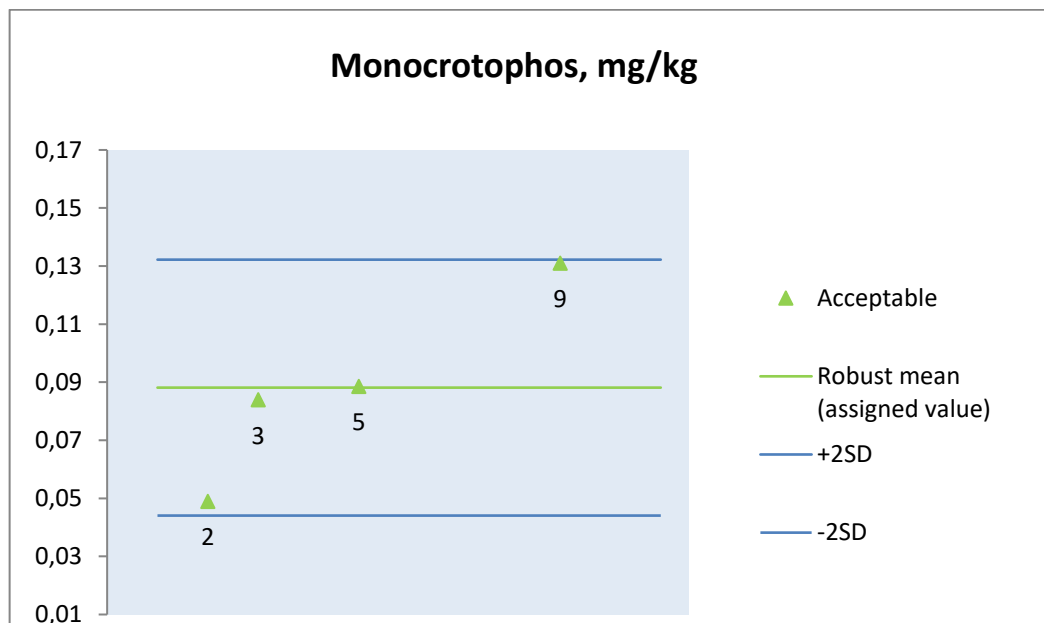
## 8.5. Fenitrothion, mg/kg



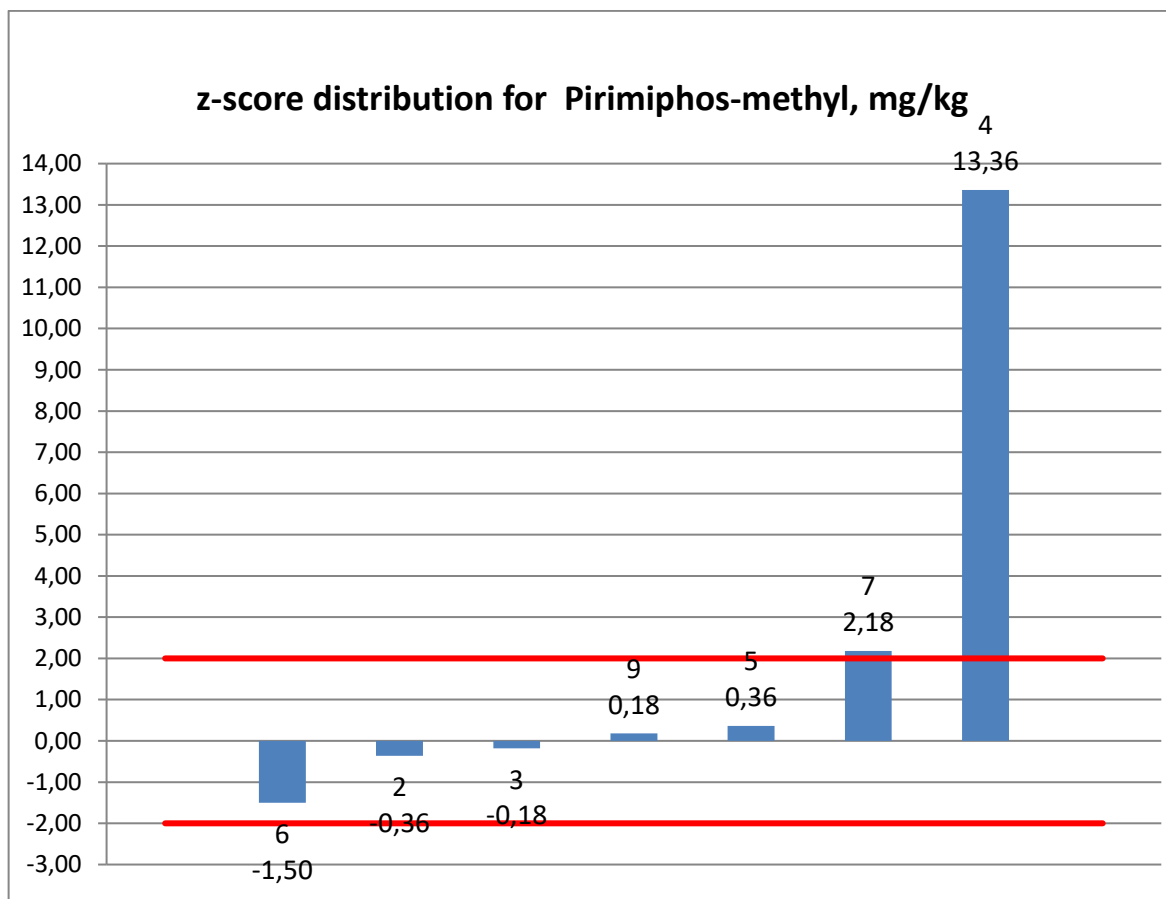
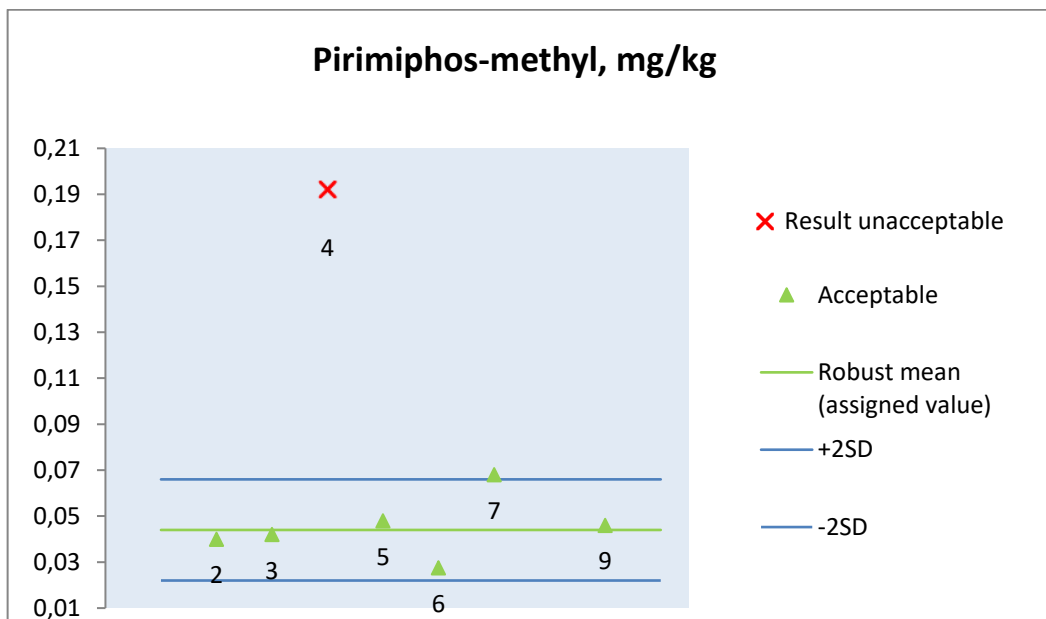
## 8.6. Malathion, mg/kg



## 8.7. Monocrotophos, mg/kg

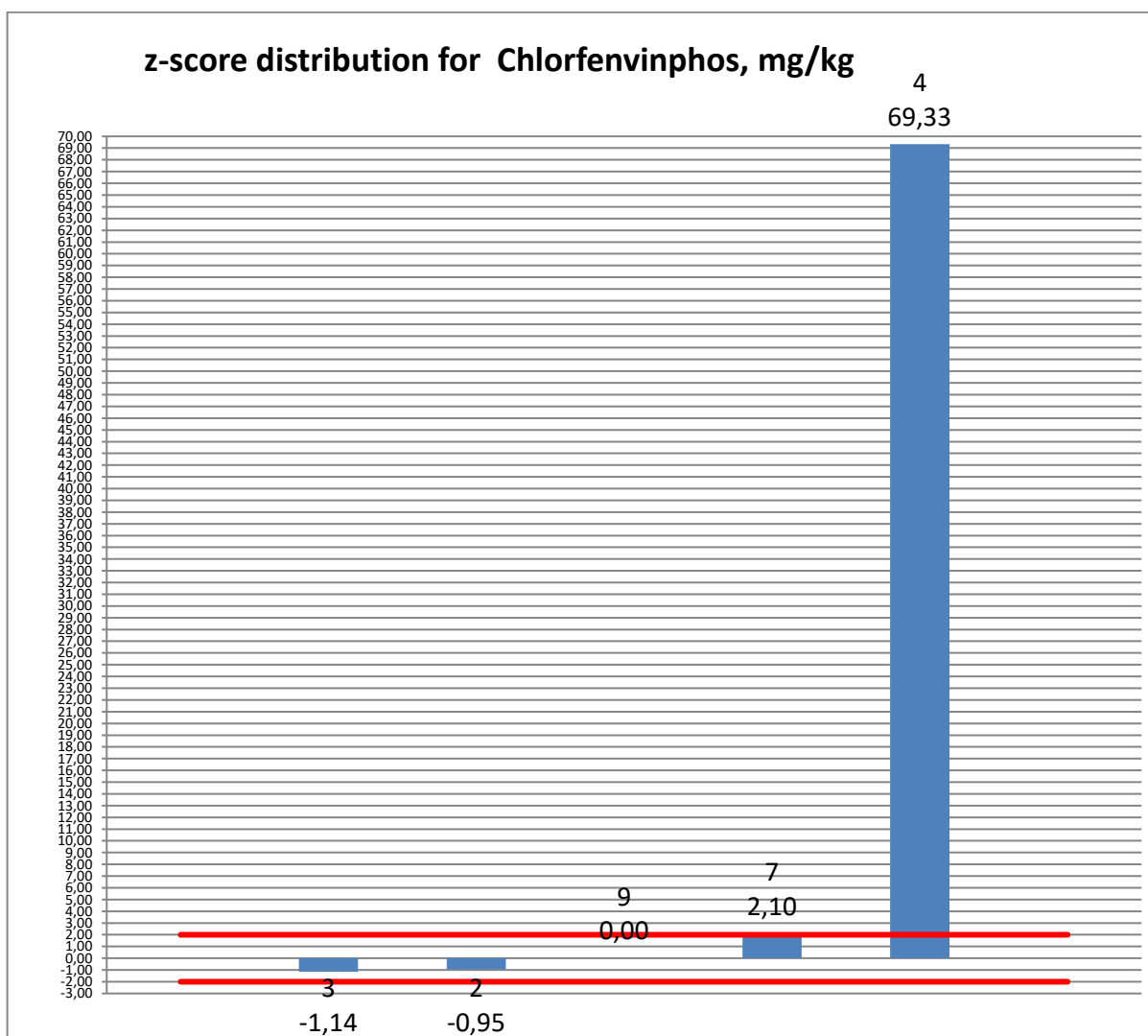
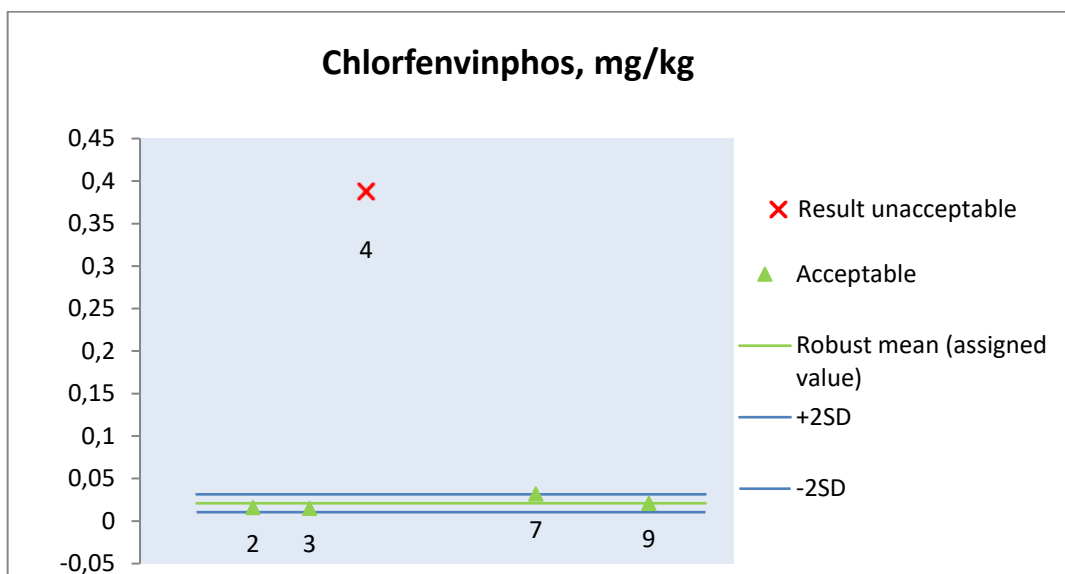


## 8.8. Pirimiphos-methyl, mg/kg

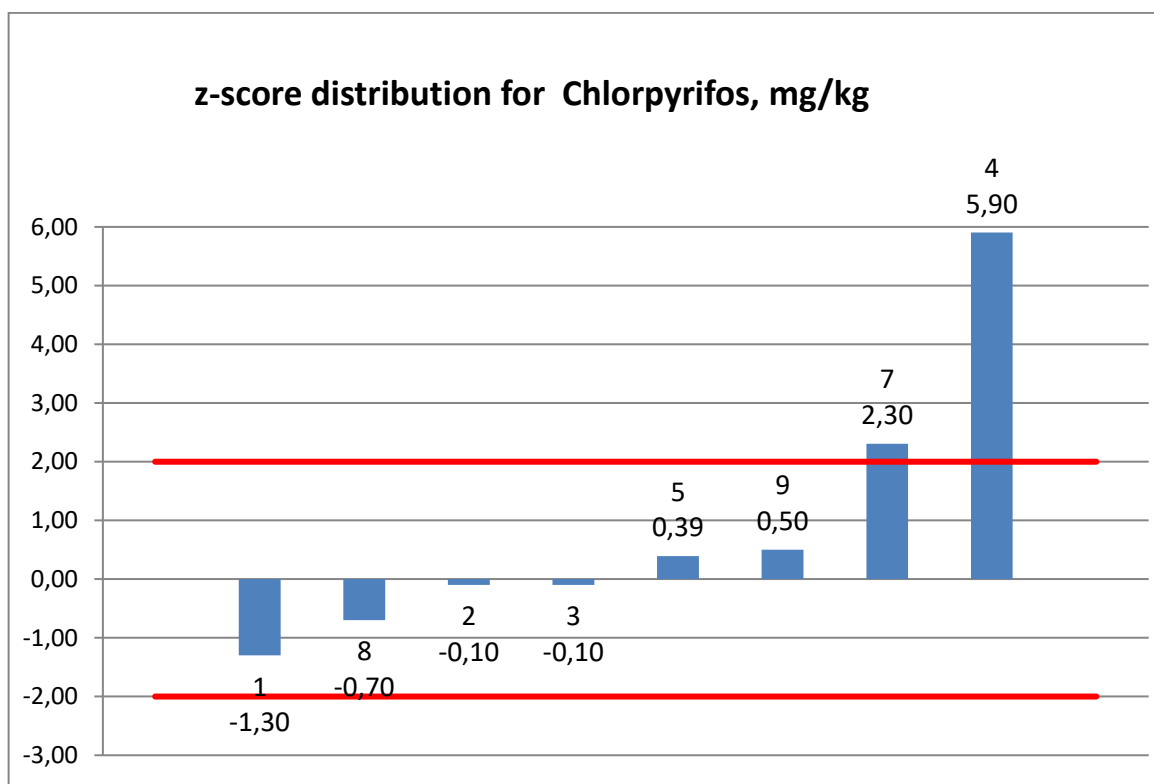
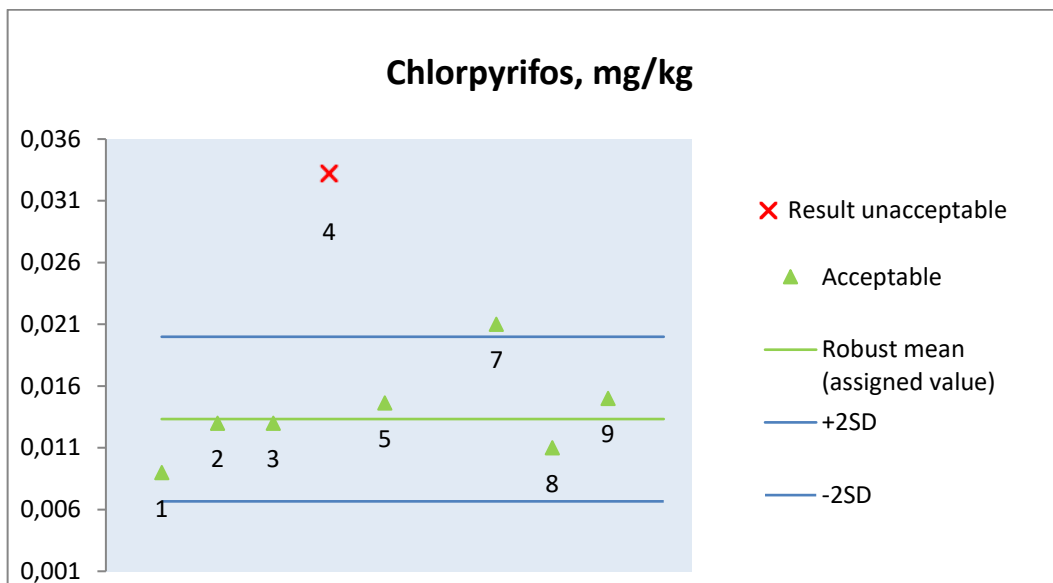


## 9. Z SCORE PLOTS AND RESULTS CHARTS FOR SPIKED PESTICIDES – SAMPLE B

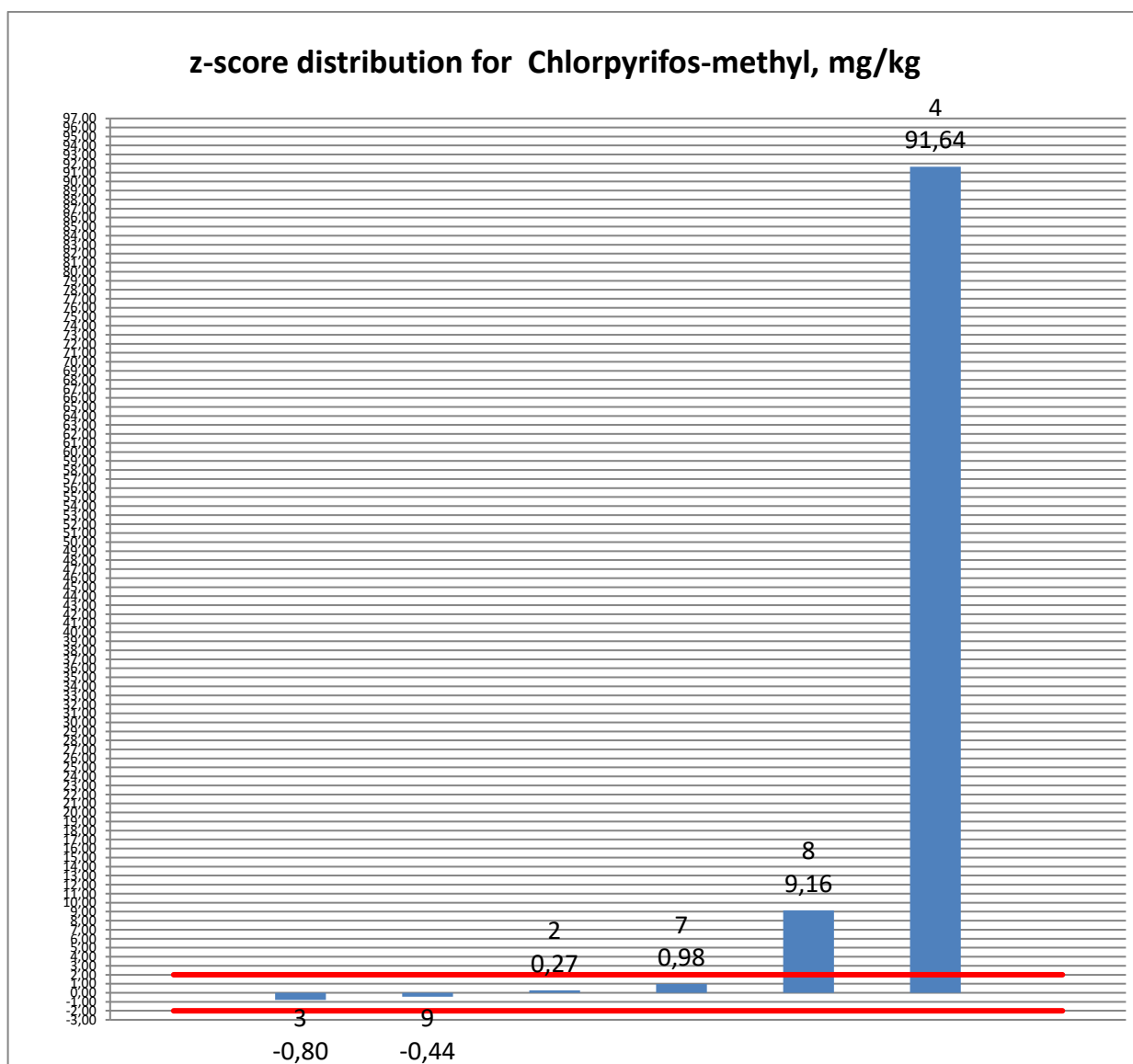
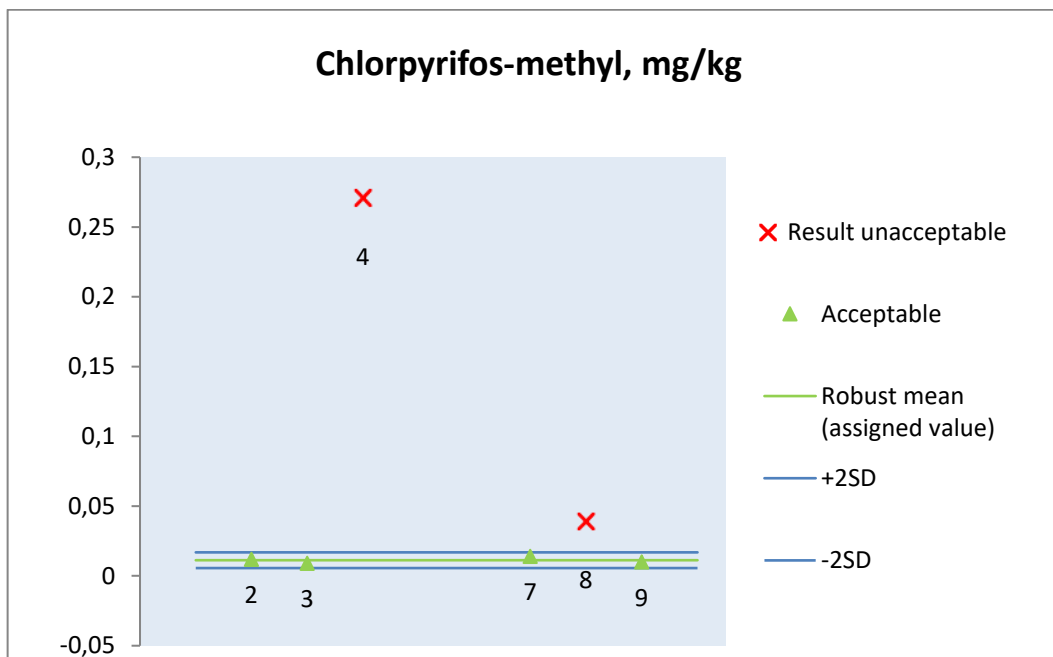
### 9.1. Chlorfenvinphos, mg/kg



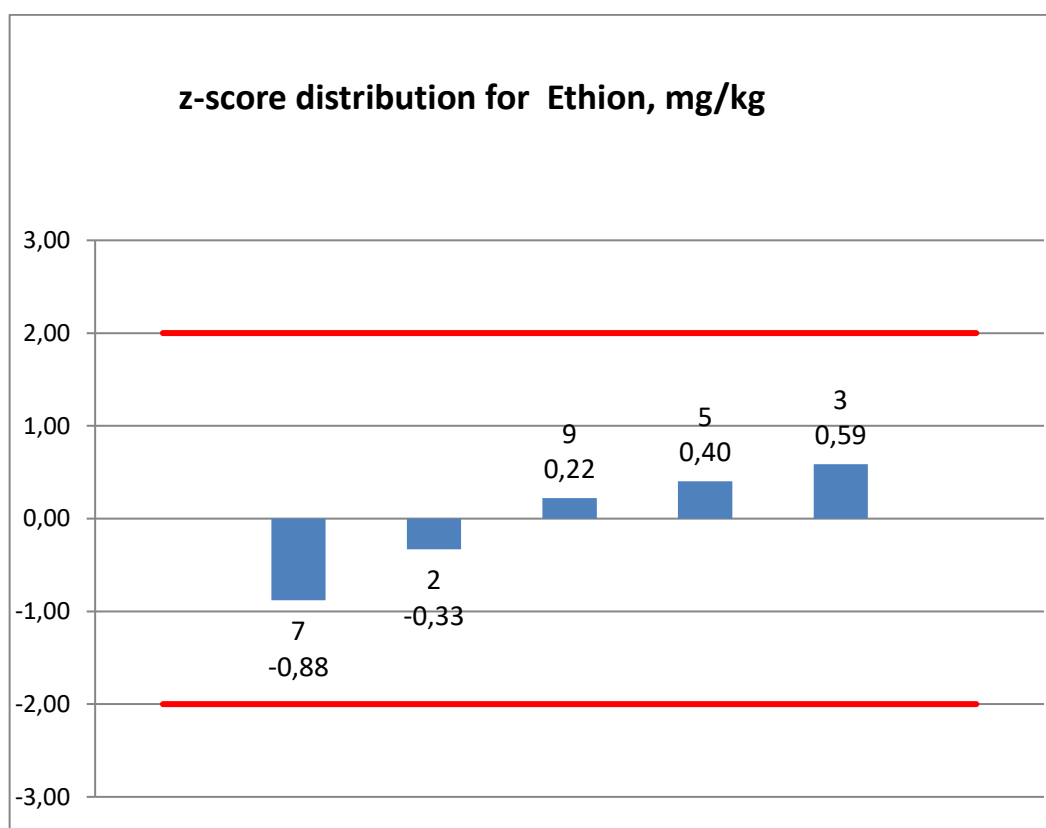
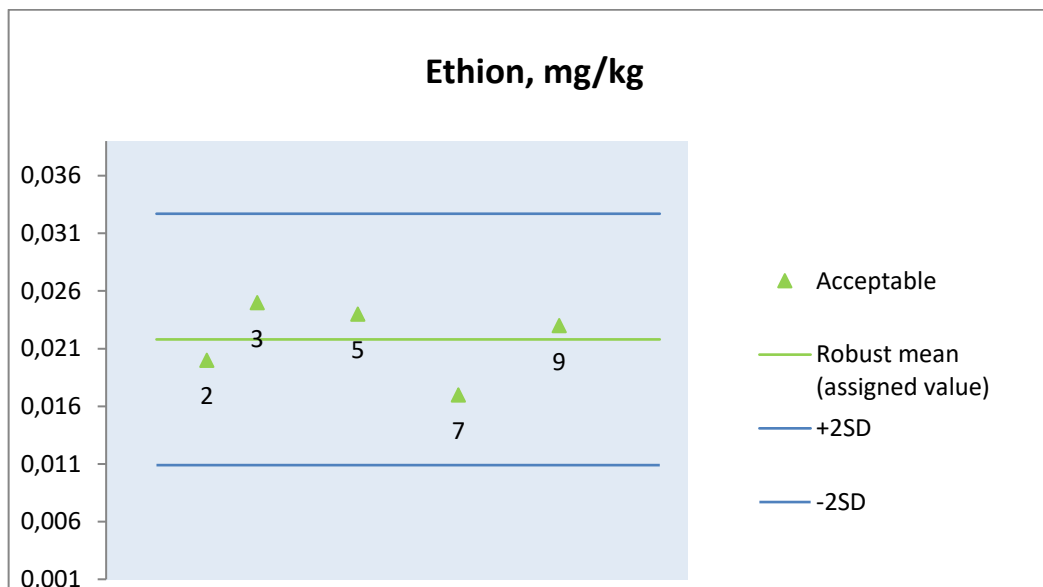
## 9.2. Chlorpyrifos, mg/kg



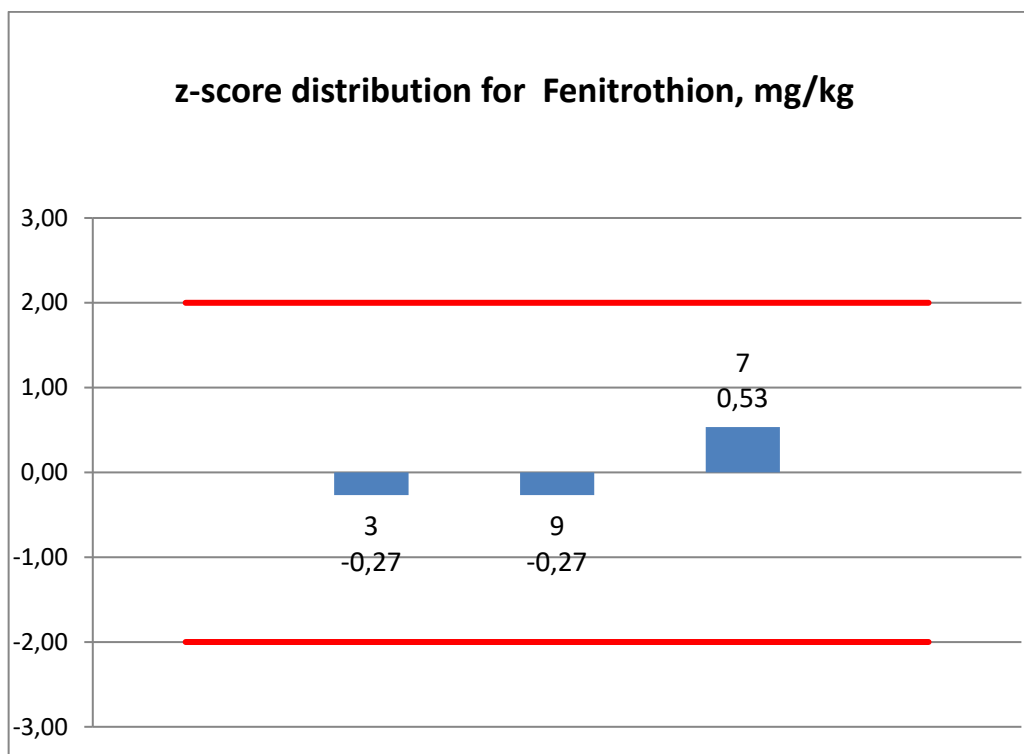
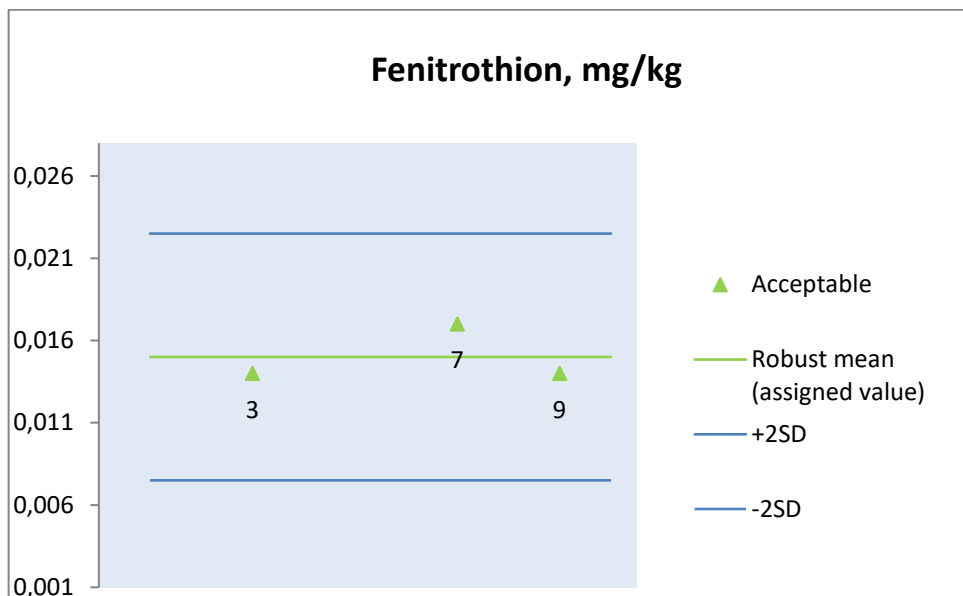
### 9.3. Chlorpyrifos-methyl, mg/kg



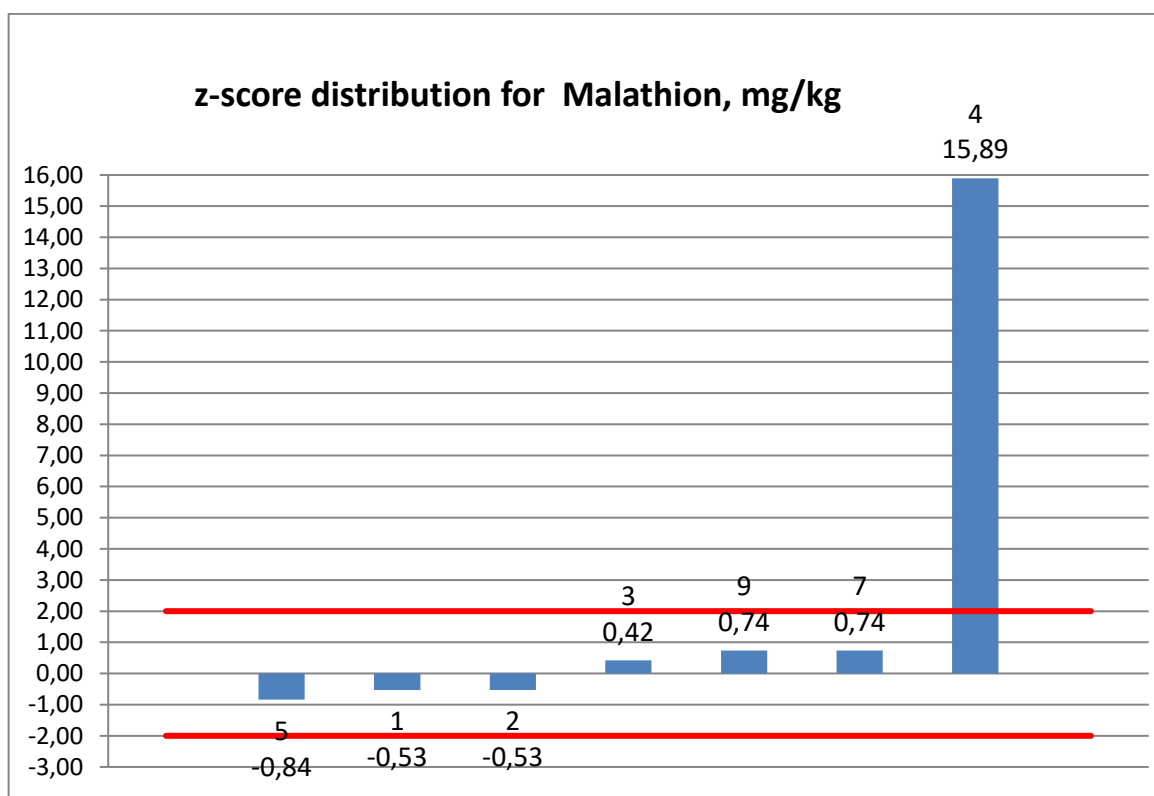
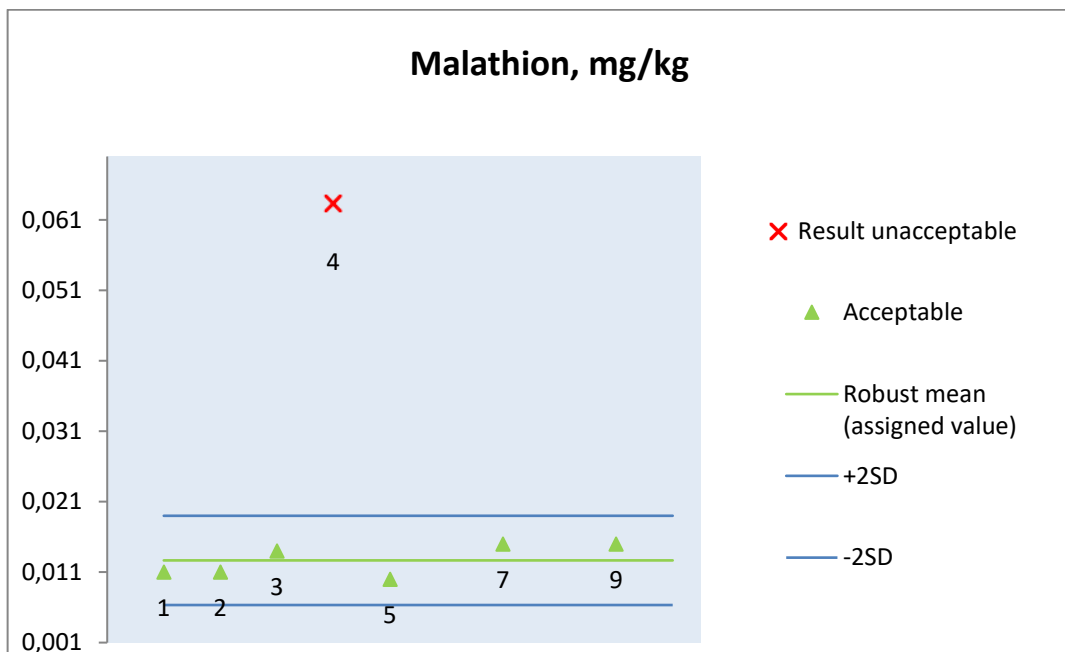
## 9.4. Ethion, mg/kg



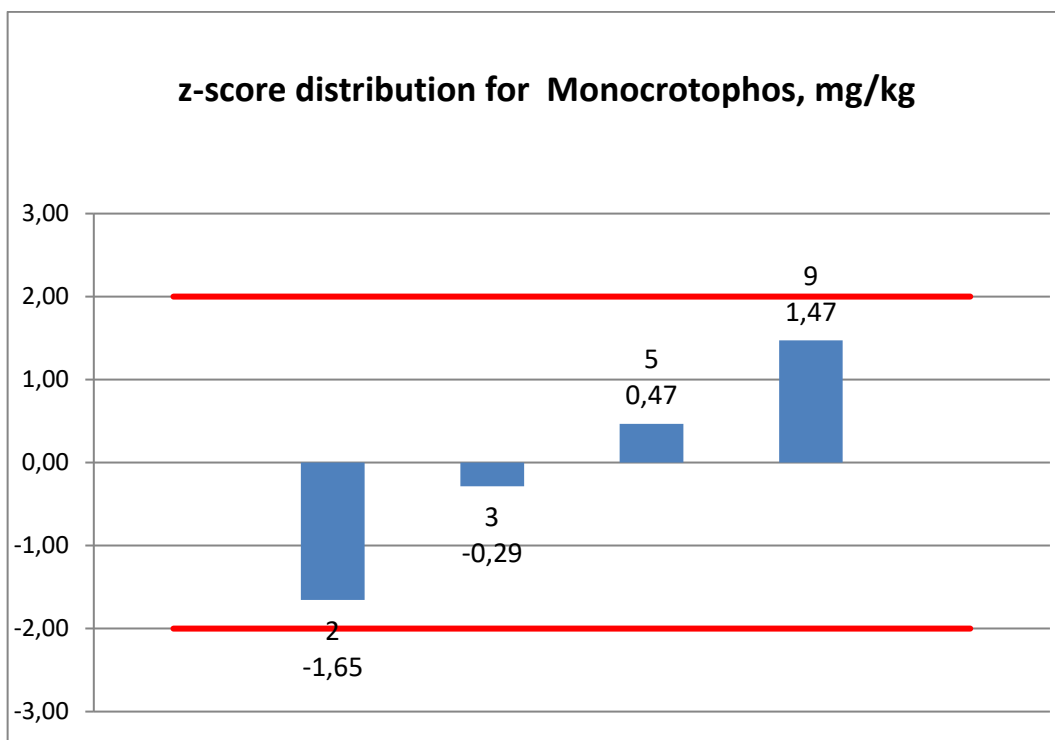
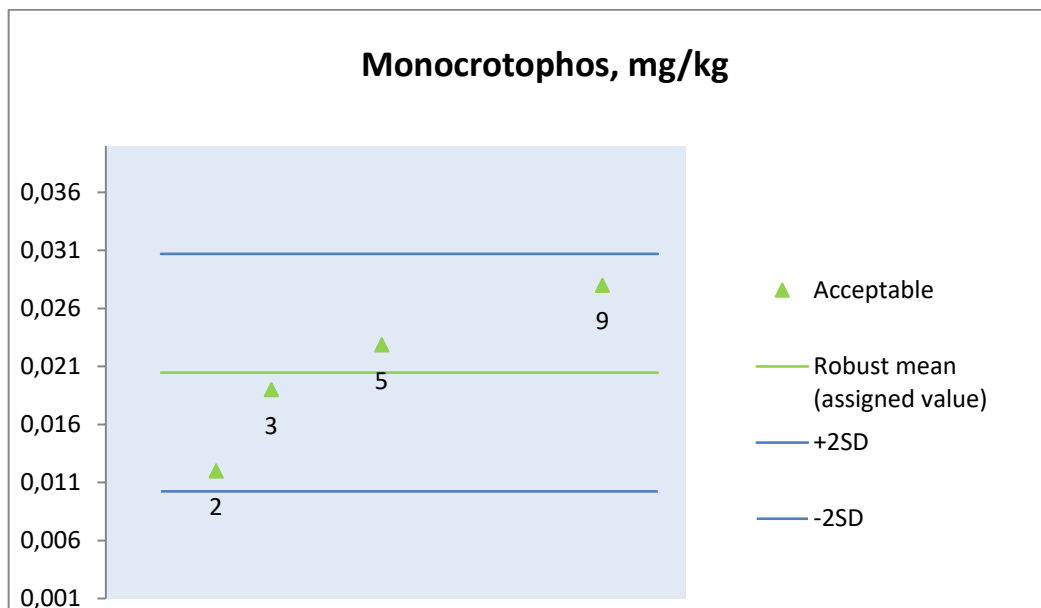
### 9.5. Fenitrothion, mg/kg



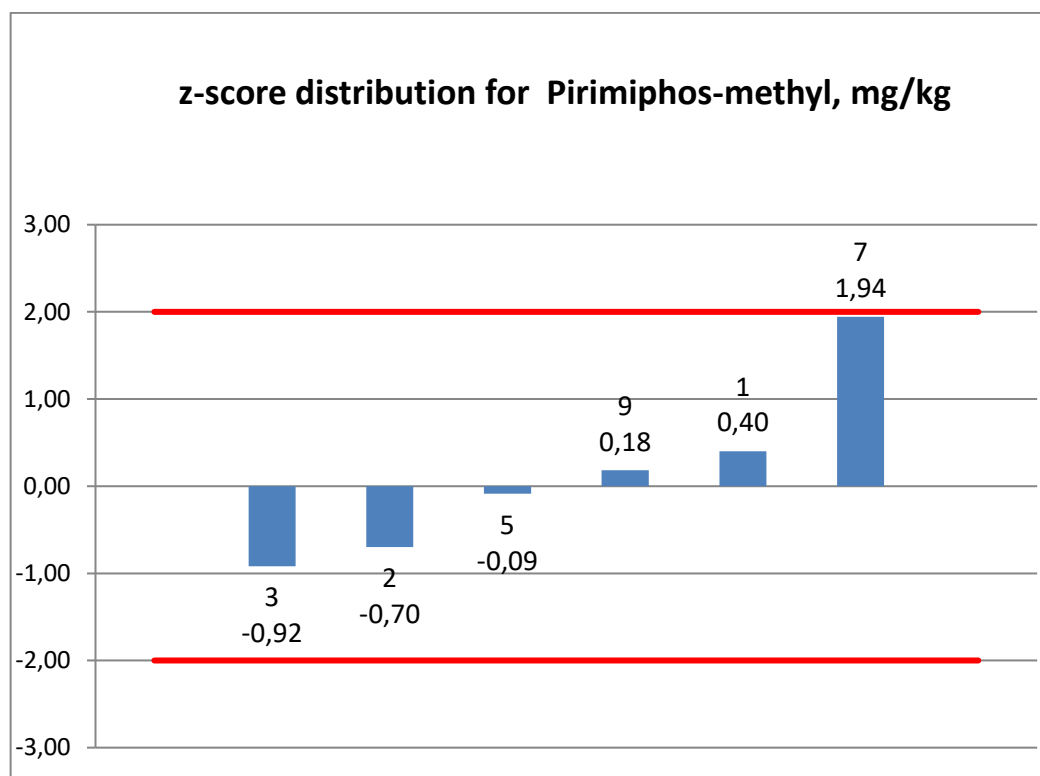
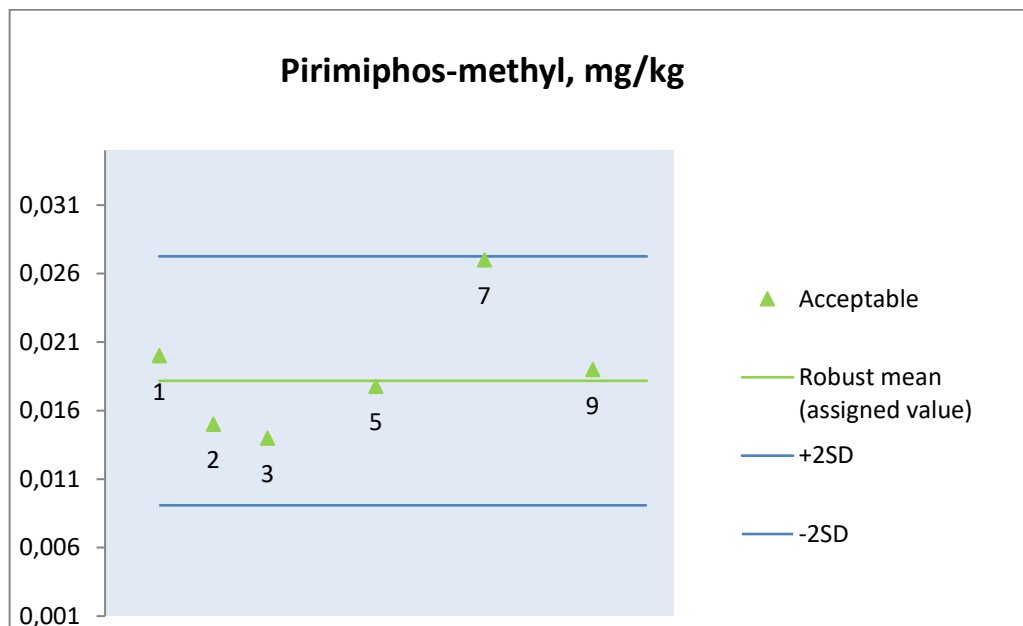
## 9.6. Malathion, mg/kg



## 9.7. Monocrotophos, mg/kg



## 9.8 Pirimiphos-methyl, mg/kg



## 10. DATA SUMMARY FOR NOT SPIKED PESTICIDES

### 10.1 SAMPLE A

	Acephate, mg/kg	Anilofos, mg/kg	Cadusafos, mg/kg	Diazinon, mg/kg	Dimethoate, mg/kg	Etrimfos, mg/kg	Fenamiphos, mg/kg	Fenthion, mg/kg
No of Results	5	4	4	8	7	3	4	6
No of Results NS	0	0	0	0	0	0	0	0
No of Results NS, %	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

	Malaaxon, mg/kg	Mephosfolan, mg/kg	Mevinphos, mg/kg	Omethoate, mg/kg	Parathion- methyl, mg/kg	Phoxim, mg/kg	Profenofos, mg/kg	Terbufos, mg/kg
No of Results	4	2	5	4	6	3	5	6
No of Results NS	0	0	0	0	0	0	0	0
No of Results NS, %	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

### 10.2 SAMPLE B

	Acephate, mg/kg	Anilofos, mg/kg	Cadusafos, mg/kg	Diazinon, mg/kg	Dimethoate, mg/kg	Etrimfos, mg/kg	Fenamiphos, mg/kg	Fenthion, mg/kg
No of Results	5	4	4	8	7	3	4	6
No of Results NS	0	0	0	0	0	0	0	0
No of Results NS, %	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

	Malaaxon, mg/kg	Mephosfolan, mg/kg	Mevinphos, mg/kg	Omethoate, mg/kg	Parathion- methyl, mg/kg	Phoxim, mg/kg	Profenofos, mg/kg	Terbufos, mg/kg
No of Results	4	2	5	4	6	3	5	6
No of Results NS	0	0	0	0	0	0	0	0
No of Results NS, %	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

## 11. RAW DATA FOR NOT SPIKED PESTICIDES

### 11.1 SAMPLE A

Laboratory number	Acephate, mg/kg	Anilofos, mg/kg	Cadusafos, mg/kg	Diazinon, mg/kg	Dimethoate, mg/kg	Etrinfos, mg/kg	Fenamiphos, mg/kg	Fenthion, mg/kg	Malaoxon, mg/kg	Mephosfolan, mg/kg	Mevinphos, mg/kg	Omethoate, mg/kg	Parathion-methyl, mg/kg	Phoxim, mg/kg	Profenofos, mg/kg	Terbufos, mg/kg
1	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-
2	< 0.01	-	-	< 0.01	< 0.01	-	-	< 0.01	-	-	< 0.01	-	< 0.01	-	< 0.01	< 0.01
3	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005
4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	<0,01	<0,01	<0,01	<0,01	<0,01	не досліджували	<0,01	<0,01	<0,01	не досліджували	<0,01	<0,01	не досліджували	<0,01	<0,01	<0,01
6				<0,02	<0,02								<0,02			
7	не визначався	не визначався	не визначався	<0,01	<0,01	не визначався	не визначався	<0,01	не визначався	не визначався	не визначався	не визначався	<0,01	не визначався	не визначався	<0,01
8																
9	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	Not tested	< 0.005	< 0.005	< 0.005	Not tested	< 0.005	< 0.005
10																

### 11.2 SAMPLE B

Laboratory number	Acephate, mg/kg	Anilofos, mg/kg	Cadusafos, mg/kg	Diazinon, mg/kg	Dimethoate, mg/kg	Etrinfos, mg/kg	Fenamiphos, mg/kg	Fenthion, mg/kg	Malaoxon, mg/kg	Mephosfolan, mg/kg	Mevinphos, mg/kg	Omethoate, mg/kg	Parathion-methyl, mg/kg	Phoxim, mg/kg	Profenofos, mg/kg	Terbufos, mg/kg
1	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-
2	< 0.01	-	-	< 0.01	< 0.01	-	-	< 0.01	-	-	< 0.01	-	< 0.01	-	< 0.01	< 0.01
3	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005
4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	<0,01	<0,01	<0,01	<0,01	<0,01	не досліджували	<0,01	<0,01	<0,01	не досліджували	<0,01	<0,01	не досліджували	<0,01	<0,01	<0,01
6				<0,02	<0,02								<0,02			
7	не визначався	не визначався	не визначався	<0,01	<0,01	не визначався	не визначався	<0,01	не визначався	не визначався	не визначався	не визначався	<0,01	не визначався	не визначався	<0,01
8																
9	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	Not tested	< 0.005	< 0.005	< 0.005	Not tested	< 0.005	< 0.005
10																

#### Remarks

1. Blank cell, «-», «не визначався», «не досліджували», «not tested» – results were reported as “not tested” by the Participants.

## 12. ASSESSMENT DATA SUMMARY FOR NOT SPIKED PESTICIDES

### 12.1 SAMPLE A

Laboratory number	Acephate, mg/kg	Anilofos, mg/kg	Cadusafos, mg/kg	Diazinon, mg/kg	Dimethoate, mg/kg	Etrimfos, mg/kg	Fenamiphos, mg/kg	Fenthion, mg/kg	Malaoxon, mg/kg	Mephosfolan, mg/kg	Mevinphos, mg/kg	Omethoate, mg/kg	Parathion-methyl, mg/kg	Phoxim, mg/kg	Profenofos, mg/kg	Terbufos, mg/kg
1				S												
2	S			S	S			S			S		S		S	S
3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
5	S	S	S	S	S		S	S	S		S	S		S	S	S
6				S	S								S			
7				S	S			S					S			S
8																
9	S	S	S	S	S	S	S	S	S		S	S	S		S	S
10																

### 12.2 SAMPLE B

Laboratory number	Acephate, mg/kg	Anilofos, mg/kg	Cadusafos, mg/kg	Diazinon, mg/kg	Dimethoate, mg/kg	Etrimfos, mg/kg	Fenamiphos, mg/kg	Fenthion, mg/kg	Malaoxon, mg/kg	Mephosfolan, mg/kg	Mevinphos, mg/kg	Omethoate, mg/kg	Parathion-methyl, mg/kg	Phoxim, mg/kg	Profenofos, mg/kg	Terbufos, mg/kg
1				S												
2	S			S	S			S			S		S		S	S
3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
5	S	S	S	S	S		S	S	S		S	S		S	S	S
6				S	S								S			
7				S	S			S					S			S
8																
9	S	S	S	S	S	S	S	S	S		S	S	S		S	S
10																

#### Remarks

1. Green colored cells contain results that are considered to be satisfactory.
2. Red colored cells contain results that are considered to be not satisfactory.
3. Blank cell – results were reported as “not tested” by the Participants.

### 13. ADDITIONAL INFORMATION

#### 13.1 PARTICIPANTS STATED METHODS (INFORMATIVE)

Laboratory number	Acephate, mg/kg	Anilofos, mg/kg	Cadusafos, mg/kg	Chlorfenvinphos, mg/kg	Chlorpyrifos, mg/kg	Chlorpyrifos-methyl, mg/kg	Diazinon, mg/kg	Dimethoate, mg/kg	Ethion, mg/kg	Etrimfos, mg/kg	Fenamiphos, mg/kg	Fenitrothion, mg/kg
1	-	-	-	-	ГХ-МС, ГХ-ТІД	-	ГХ-МС, ГХ-ТІД	-	-	-	-	-
2	EN 15662	-	-	EN 15662	EN 15662	EN 15662	EN 15662	EN 15662	EN 15662	-	-	EN 15662
3	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (GC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (GC-MS/MS)
4	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018
5	LC-MS/MS	LC-MS/MS	LC-MS/MS	-	LC-MS/MS	LC-MS/MS	LC-MS/MS	LC-MS/MS	LC-MS/MS	-	LC-MS/MS	-
6	не досліджув.	не досліджув.	не досліджув.	не досліджув.	GC/FTD	GC/FTD	GC/FTD	GC/FTD	не досліджув.	не досліджув.	не досліджув.	GC/FTD
7				ДСТУ EN 15665	ДСТУ EN 15666	ДСТУ EN 15667	ДСТУ EN 15668	ДСТУ EN 15669	ДСТУ EN 15670			ДСТУ EN 15673
8					EN 15662, ДСТУ EN 12393-3	EN 15662, ДСТУ EN 12393-3						
9	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS
10					ДСТУ EN 12393-1-2-3:2003							ДСТУ EN 12393-1-2-3:2003

#### Remarks

- Blank cell, «-», «не досліджув.» – results were reported as “not tested” by the Participants.

Laboratory number	Fenthion, mg/kg	Malaaxon, mg/kg	Malathion, mg/kg	Mephosfolan, mg/kg	Mevinphos, mg/kg	Monocrotophos, mg/kg	Omethoate, mg/kg	Parathion-methyl, mg/kg	Phoxim, mg/kg	Pirimiphos-methyl, mg/kg	Profenofos, mg/kg	Terbufos, mg/kg
1	-	-	ГХ-МС, ГХ-ТІД	-	-	-	-	-	-	ГХ-МС, ГХ-ТІД	-	-
2	EN 15662	-	EN 15662	-	EN 15662	EN 15662	-	EN 15662	-	EN 15662	EN 15662	EN 15662
3	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (GC-MS/MS)	BS EN 15662:2018 (GC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (GC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)	BS EN 15662:2018 (LC-MS/MS)
4	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018	DIN EN 15662:2018
5	LC-MS/MS	LC-MS/MS	LC-MS/MS	-	LC-MS/MS	LC-MS/MS	LC-MS/MS	-	LC-MS/MS	LC-MS/MS	LC-MS/MS	LC-MS/MS
6	не досліджув.	не досліджув.	GC/FTD	не досліджув.	не досліджув.	не досліджув.	не досліджув.	GC/FTD	не досліджув.	GC/FTD	не досліджув.	не досліджув.
7	ДСТУ EN 15674		ДСТУ EN 15676					ДСТУ EN 15681		ДСТУ EN 15683		ДСТУ EN 15685
8												
9	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS	GC-MS/MS, LC-MS/MS
10												

#### Remarks

- Blank cell, «-», «не досліджув.» – results were reported as “not tested” by the Participants.

## 13.2. OTHER ADDITIONAL INFORMATION

Laboratory number	Sample's preparation			Testing		
	Cleaning method (QuEChERS, sorbents, etc.)	Extraction solvent	Temperature for concentration	Type and length of the column	Gas carrier speed	Detector and detecting type
1	Виморожування + флорисил + очистка□	Ацетонітрил: дихлорметан 75:25	40°C	SLB-5ms, 30м*0,32мм*0,32мкм	100 кПа□	ГХ-МС, ГХ-ТІД
2	Quechers	Acetonitrile	-	Acquity UPLC BEH C18 1,7um	Acetonitrile, water, ammonia formiate, formic acid	MS/MS (Sciex 5500+ Triple Quadrupole)
3	QuEChERS Agilent 5982-6650, Agilent 5982-5156	Вода:ацетонітрил, 1:1	-	GC: неполярнка капілярна колонка SGE BP5MS, length 30m LC: Waters Acquity UPLC® BEH C18 1,7 μm 2,1x150 mm	LC flow 0.3 ml/min GC (He) flow 1.4 мл/хв	GC/MS/MS (APGC), LC/MS/MS
4	Method EN 15662:2018.QuEChERS Sorbents and QuEChERS dispersive pouches	Acetonitrile	22° C (Balance); Detector Temp; 300° C	Primary Column; Rxi-5ms 30 m x 0.25 mmID x 0.25 μm df (RESTEK); Secondary Column; Rxi-17 Sil MS 2meter, 0.25 mmID, 0.25 μm df (RESTEK)	1.5 ml/min	GC MS detector and GCxGC TOF/MS
5	QuEChERS, C18+Z-Sep	0,1% оцтова кислота в ацетонітрилі	-	Kinetex Biphenyl, 100x2,1 мм, 2,6 мкм	-	LC-MS/MS
6	Ацетонітрил	Ацетон-вода, гексан	20 C	Restek RTX-5 30m 0,25um	3,5 мл/хв	FTD (термо-іонний детектор)
8	EN 15662	петролейний ефір	40,00	30,00	40,8 см/с	ДЕЗ
9	Quechers	Ацетонітрил	-	30 м, 5MS		MS/MS
10	Очищення на колонці з флоризилом	Ацетонітрил, петролейний етер	40 град. C	TG-XLBMS, 30 м	2,5 мл/мин.	ДПР

## **14. NORMATIVE REFERENCE**

1. ISO/IEC 17043:2023 Conformity assessment – General requirements for the competence of proficiency testing providers.
2. Analytical Methods Committee, Robust Statistics – How not to reject outliers Part 1. Basic Concepts, *Analyst*, 1989, 114, 1693-1697.
3. Fearn, T. and Thompson, M, A new test for ‘sufficient homogeneity’, *Analyst*, 2001, 126, 1414-1417.
4. ISO 13528:2022 Statistical methods for use in proficiency testing by interlaboratory comparison.
5. ISO 33405:2024 Reference materials — Approaches for characterization and assessment of homogeneity and stability.
6. ILAC Discussion Paper on Homogeneity and Stability Testing, April 2008.
7. ISO 17034:2016 General requirements for the competence of reference material producers.
8. GENERAL PROTOCOL for EU Proficiency Tests on Pesticide Residues in Food and Feed – 7<sup>th</sup> edition, revised 27<sup>th</sup> January 2017, EURL.