Director
Metrology service Ltd.

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50006
Перевірка
професійного рівня

PROFICIENCY TESTING PT.UA.6.1.2017
AFLATOXIN B_1 IN FEEDING STUFFS AND FOOD PRODUCTS OF PLANT ORIGIN
PROFICIENCY TESTING REPORT
ROUND 5 MAY 2026

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2. SUMMARY

2.1. The purpose of proficiency testing in mycotoxins 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. Current PT scheme is registered in the EPTIS database.

2.3. This is the final report on the PT.UA.6.1.2017 Round 5 held in April-May 2026. This report is issued according to ISO/IEC 17043[1] and PT.UA.6.1.2017 Round 5 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.

2.12. Provider is accredited by NAAU in accordance with the requirements of ISO/IEC 17043. 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.

2.13. Clause 9 of this report is stated for information purposes only. Provider did not assess any results based on this information.

3. GENERAL PROTOCOL FOR PROFECIENCY 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 ППТ 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.6.1.2017 Round 5. 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. Sample preparation report can be provided upon request.

3.3. DISPATCH AND RECEIPT OF SAMPLES

3.3.1. Samples of test material – **milled maize** were dispatched 14.04.2026 according to schedule of proficiency testing programme PT.UA.6.1.2017 Round 5.

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

3.3.3. A total of 10 participants from **3 countries** received one sample. Results were returned from 10 participants.

3.3.4. The samples were shipped to participants via the commercial delivery service "Nova Poshta" LL, the delivery to abroad was done by courier delivery.

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 Hurwitz characteristic equation was chosen as the source of the target standard deviation.

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 [1,2,5]. Provider recommends corrective actions if $|z| > 3$ and preventive actions if $2 < |z| \leq 3$.

3.5.5. All results were considered to be satisfactory. In round 4 all results were considered to be satisfactory

4. HOMOGENITY AND STABILITY ASSESMENT

4.1. Samples 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 14 samples were produced according to [6].

4.2. Statistical analysis of the resulting data for homogeneity was carried out using the industry standard Cochran's 'C' test and analytical variance test for 'sufficient homogeneity' according to [1,4].

4.3. Stability was not assessed for the period of this round by the decision of the expert group for mycotoxins.

4.4. Produced samples were found to be sufficiently homogeneous: «Aflatoxin B_1, µg/kg»

Aflatoxin B1, µg/kg										
Дослідження гомогенності/Homogenity test										
Аналіз викидів за тестом Кохрана(C -тест)/Cohran's C test for outliers						Аналіз на 'достатню однорідність'/Test for 'sufficient homogenity'				
Номер зразку/ Sample number	Результат/ Result A	Результат/ Result B	Average	SD²		Номер зразку /Sample number	Результат/ Result A	Результат/ Result B	SUM	Difference²
1	2,220	2,060	2,140	0,0128	0,00	1	2,22	2,06	4,28	0,0256
2	2,170	2,170	2,170	0,0000	0,00	2	2,17	2,17	4,34	0,0000
3	2,130	2,020	2,075	0,0060	0,00	3	2,13	2,02	4,15	0,0121
										0,0377
Mean	2,128		Worst pair	0,0128		Mean	2,128			
Max	2,22		SUM of SD²	0,0189		Max	2,22			
Min	2,02		C	0,6790		Min	2,02			
			Ccr, 5%	0,9669						
			Ccr, 1%	0,9933		Analytical variance S²an	0,0063	SD	0,0752	
			Conclusion			Sanal	0,0793	RSDR	3,5338	
			5%	PASS		Ssums	0,0094			
			1%	PASS		MSb	0,0047			
					Between sample variance S²sam		-0,0008			
Remarks										
1. Cohran's C test is described in ISO 5727-2 and ISO 13528:2022										
2. Test for 'sufficient homogenity' is performed according to Annex B ISO 13528:2022										

Source of σp value to use		
Use(write '1')	Source	σp
	C>13.8%, HORWITZ	461,3386
	120ppb<C<13.8%, HORWITZ	0,8594
1	C<120 ppb	0,4682
MASS NEGATIVE POWER FOR HORWITZ EQUATION(%=2, ppb=9,ppm=6)		9
	SD	0,0687
	Trial SD	0,4480
	Target SD chosen	0,4682
	σ²all	0,0197
	Replicates	3
	F1	2,996
	F2	4,276
	Critical value	0,0860
	Between sample variance S²sam	-0,0008
	Sufficient homogenity test	PASS

4.5. Data for all analytes.

	Aflatoxin B_1, µg/kg	Aflatoxin B_2, µg/kg	Aflatoxin G_1, µg/kg	Aflatoxin G_2, µg/kg	Sum of aflatoxins, µg/kg
Homogenity and stability (Гомогенність та стабільність)					
Cohran's 'C' test (С-тест "Кохрана")					
Crtitical value (5%,3pairs)=0,9669	0,6790	0,6154	0,4186	0,8305	0,9049
Mean Result	2,1283	0,5467	0,9467	1,1883	4,8100
Conclusion (Висновок)	PASS	PASS	PASS	PASS	PASS
Analytical variance test (тест аналітичної дисперсії)					
S²anal	0,0063	0,0017	0,0014	0,0010	0,0177
Sanal	0,0793	0,0416	0,0379	0,0314	0,1330
S²sample	0,0000	0,0000	0,0011	0,0000	0,0000
σ_p	0,4682	0,1203	0,2083	0,2614	1,0582
σ_p source	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz
σ²all	0,0197	0,0013	0,0039	0,0062	0,1008
Critical value	0,0860	0,0113	0,0178	0,0226	0,3776
Conclusion (Висновок)	PASS	PASS	PASS	PASS	PASS

5. DATA SUMMARY

	Aflatoxin B_1, µg/kg	Aflatoxin B_2, µg/kg	Aflatoxin G_1, µg/kg	Aflatoxin G_2, µg/kg	Sum of aflatoxins, µg/kg
No of Results	8	5	5	5	9
No of Results |z|>3	0	0	0	0	0
No of Results |z|>3, %	0,000	0,000	0,000	0,000	0,000
Mean	2,018	0,572	0,848	1,356	4,623
Min	1,491	0,460	0,529	1,200	3,400
Max	2,420	0,752	1,000	1,558	6,200
SD	0,303	0,113	0,184	0,140	0,723
Median	2,060	0,550	0,900	1,300	4,510
Robust mean (assigned value)	2,035	0,564	0,895	1,356	4,573
Robust SD	0,270	0,097	0,085	0,140	0,228
Spiked level	2,200	0,600	1,200	1,500	5,500
Recovery, %	92,516	93,973	74,594	90,373	83,143
SD from method (Tr.SD)	N/A	N/A	N/A	N/A	N/A
SD from Horwitz eq.	0,448	0,124	0,197	0,298	1,006
Target SD	0,448	0,124	0,197	0,298	1,006
Source of target SD of PT	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz

6. RAW DATA

Laboratory number	Aflatoxin B_1, µg/kg	Aflatoxin B_2, µg/kg	Aflatoxin G_1, µg/kg	Aflatoxin G_2, µg/kg	Sum of aflatoxins, µg/kg
1	2,42				3,4
2					4,800
3	2,19	0,46	0,88	1,43	4,49
4	2,283				
5	2,12				4,48
6	2,0	0,5	0,9	1,2	4,6
7	1,9	0,6	1,0	1,3	4,8
8					6,2
9	1,491	0,752	0,529	1,558	4,33
10	1,74	0,55	0,93	1,29	4,51

7. Z SCORES

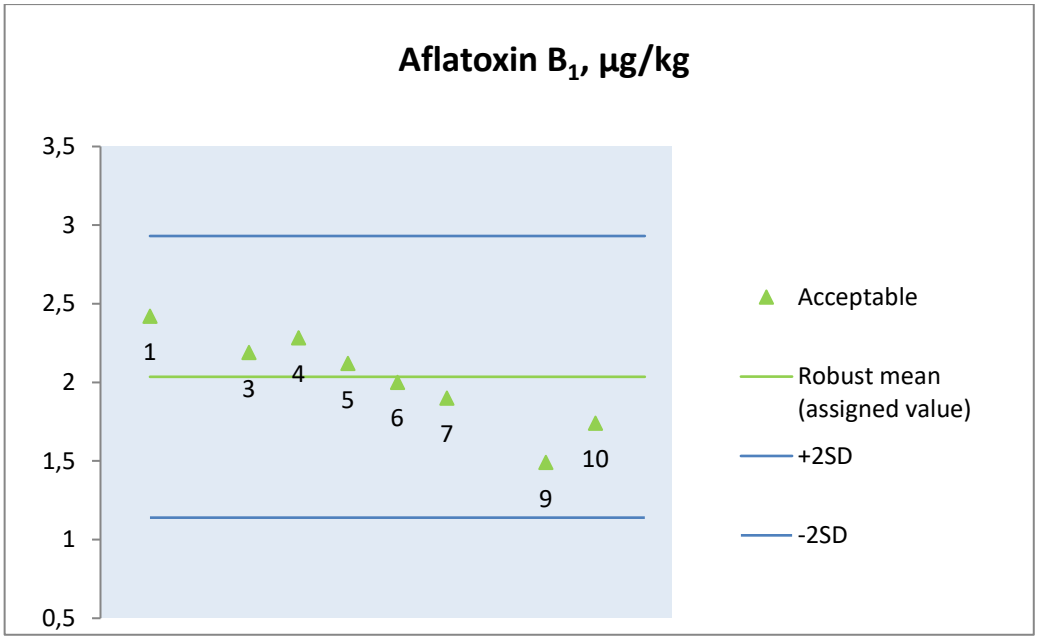
Laboratory number	Aflatoxin B_1, µg/kg	Aflatoxin B_2, µg/kg	Aflatoxin G_1, µg/kg	Aflatoxin G_2, µg/kg	Sum of aflatoxins, µg/kg
1	0,86				-1,17
2					0,23
3	0,35	-0,84	-0,08	0,25	-0,08
4	0,55				
5	0,19				-0,09
6	-0,08	-0,51	0,02	-0,52	0,03
7	-0,30	0,29	0,53	-0,19	0,23
8					1,62
9	-1,22	1,52	-1,86	0,68	-0,24
10	-0,66	-0,11	0,18	-0,22	-0,06

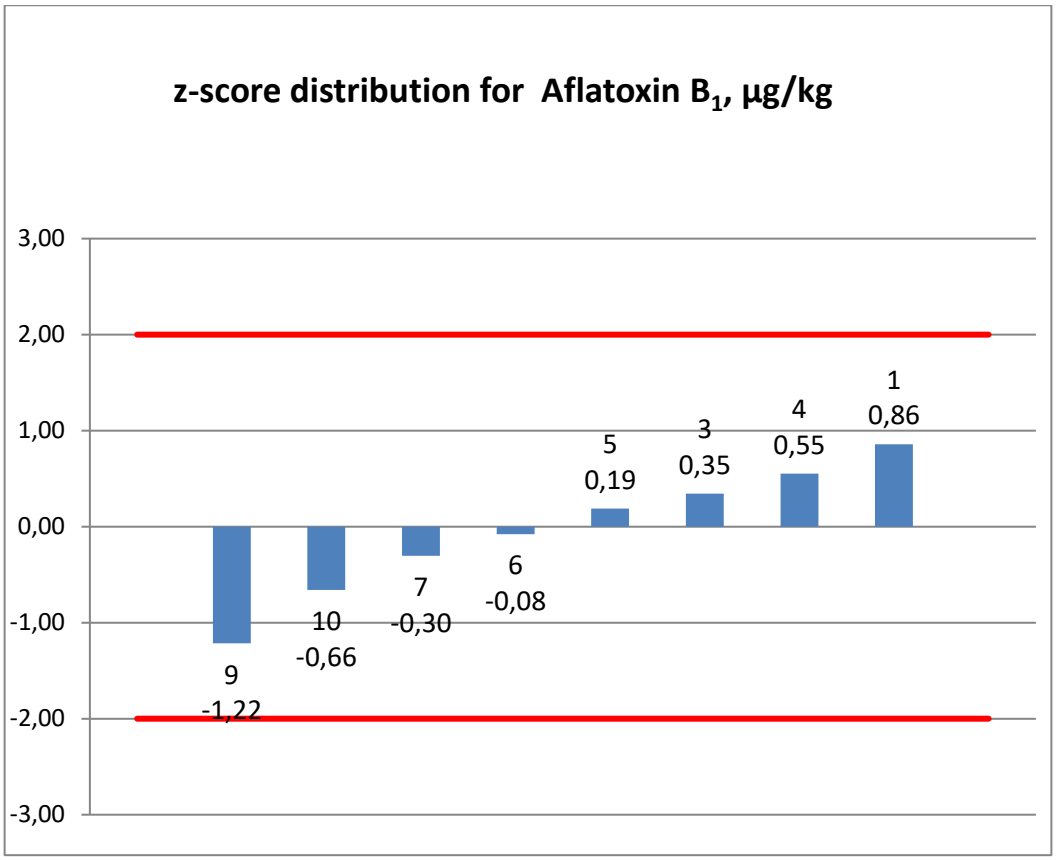
Remarks

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

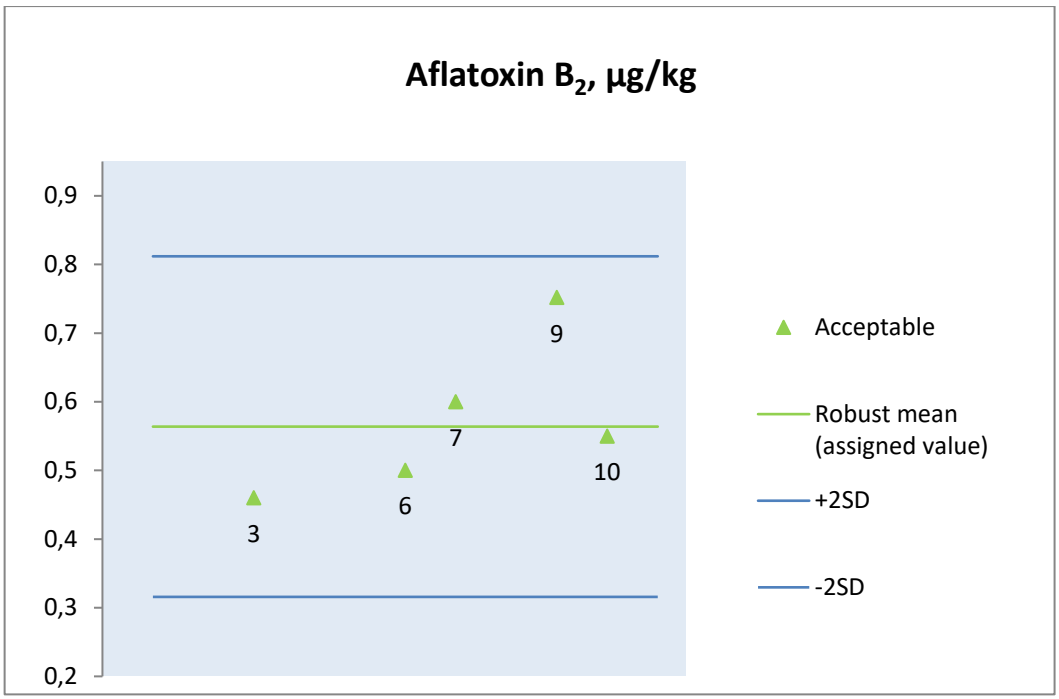
8. Z SCORE PLOT AND RESULTS CHART.

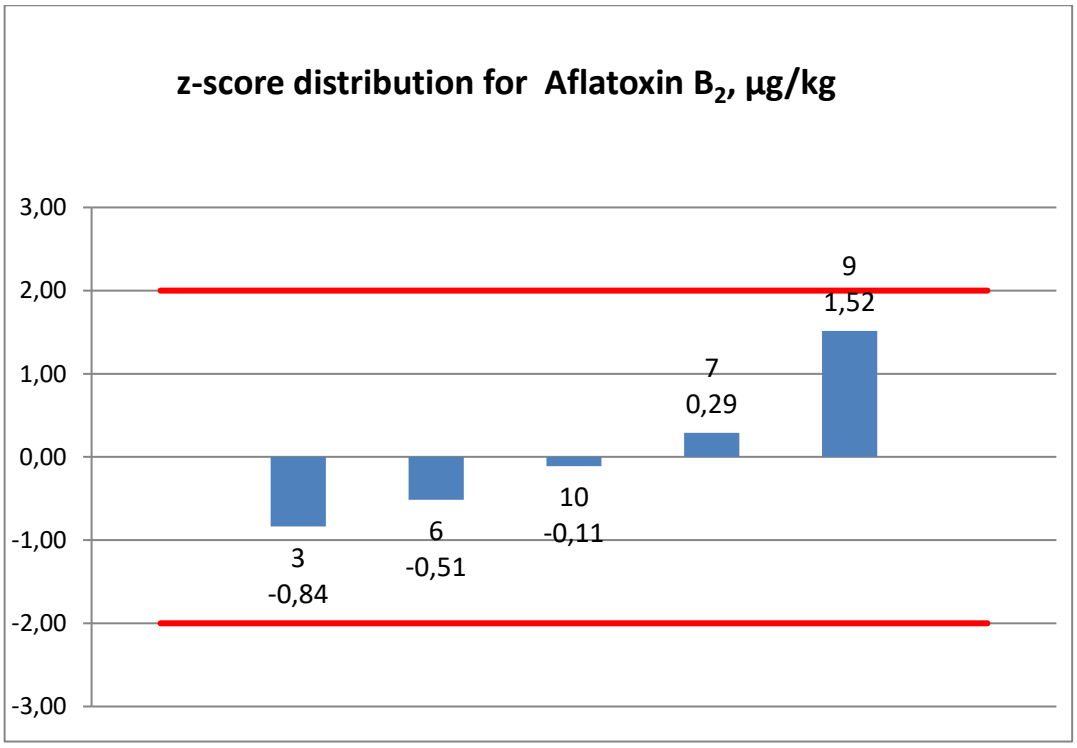
8.1. Aflatoxin B_1, µg/kg



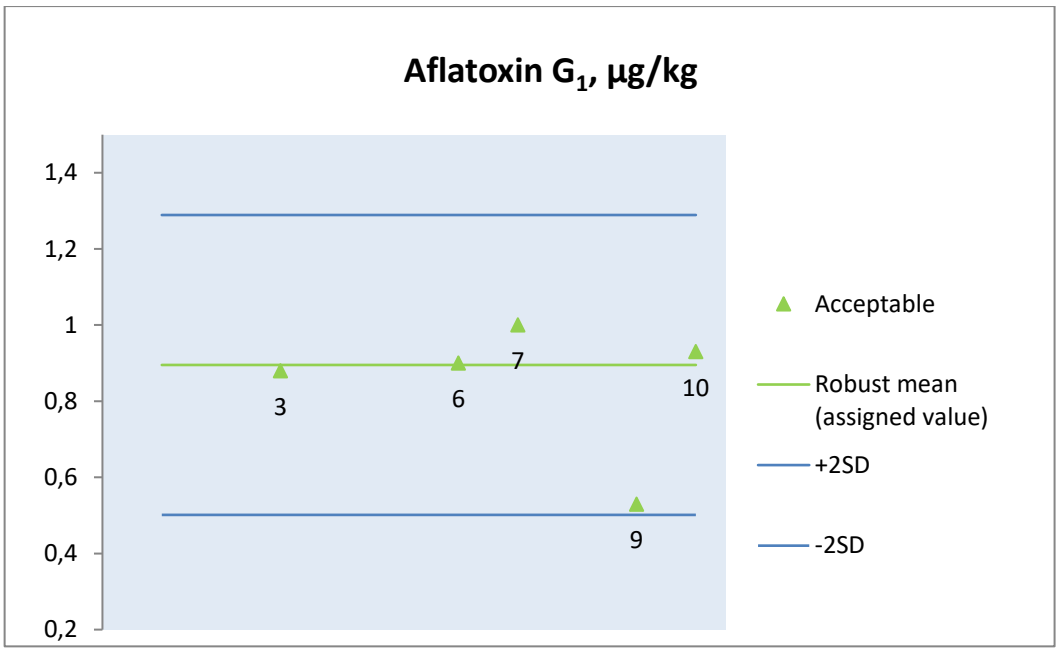


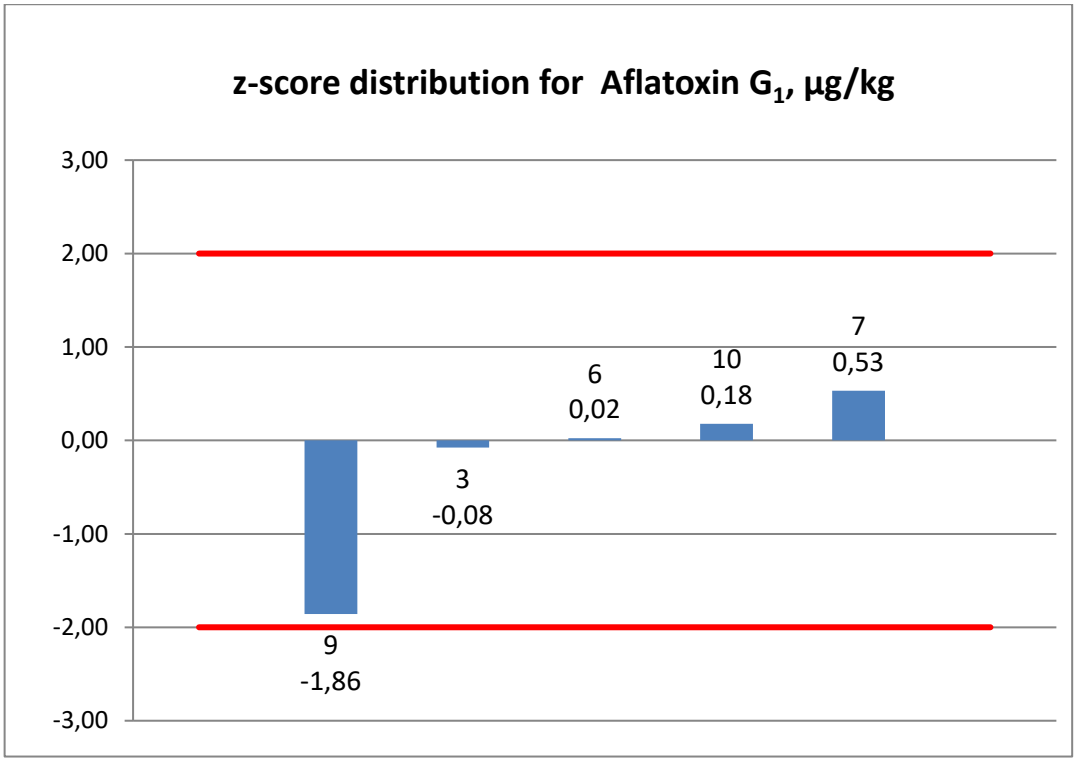
8.2. Aflatoxin B_2, µg/kg



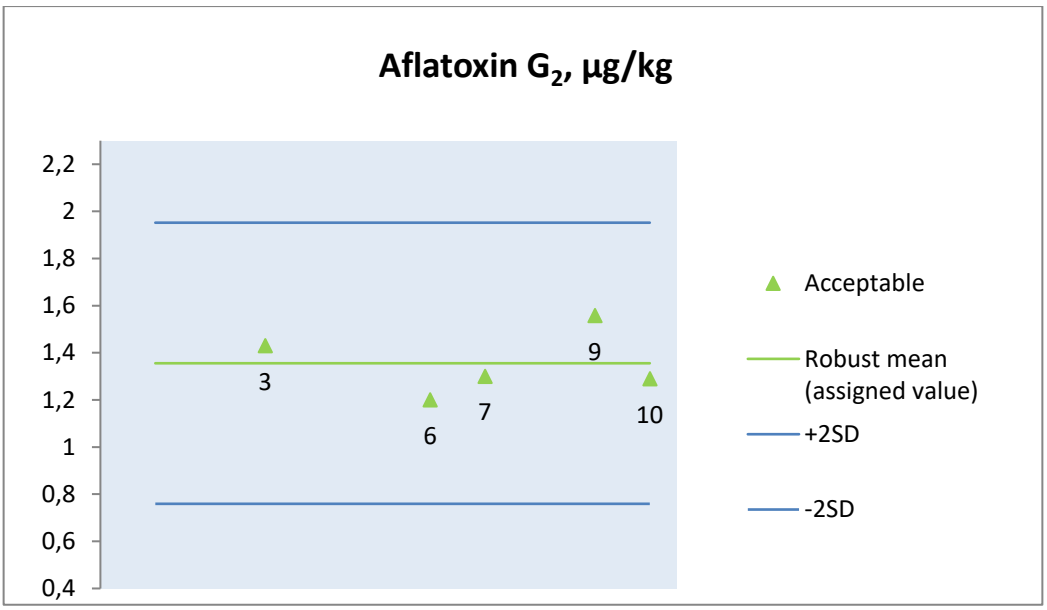


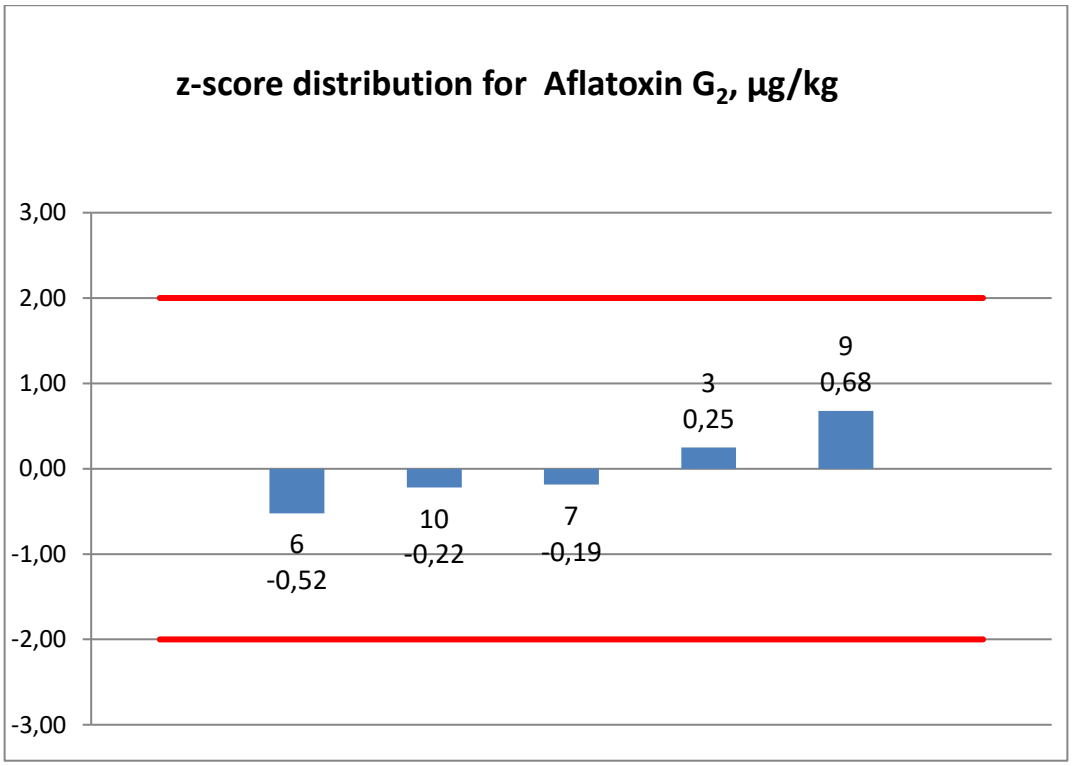
8.3. Aflatoxin G_1, µg/kg



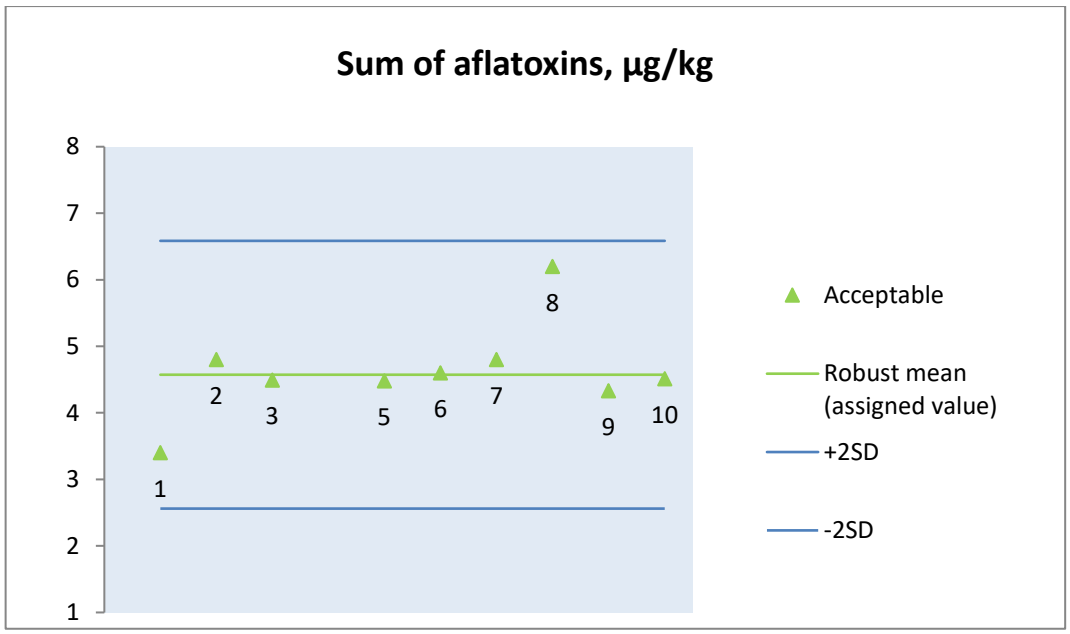


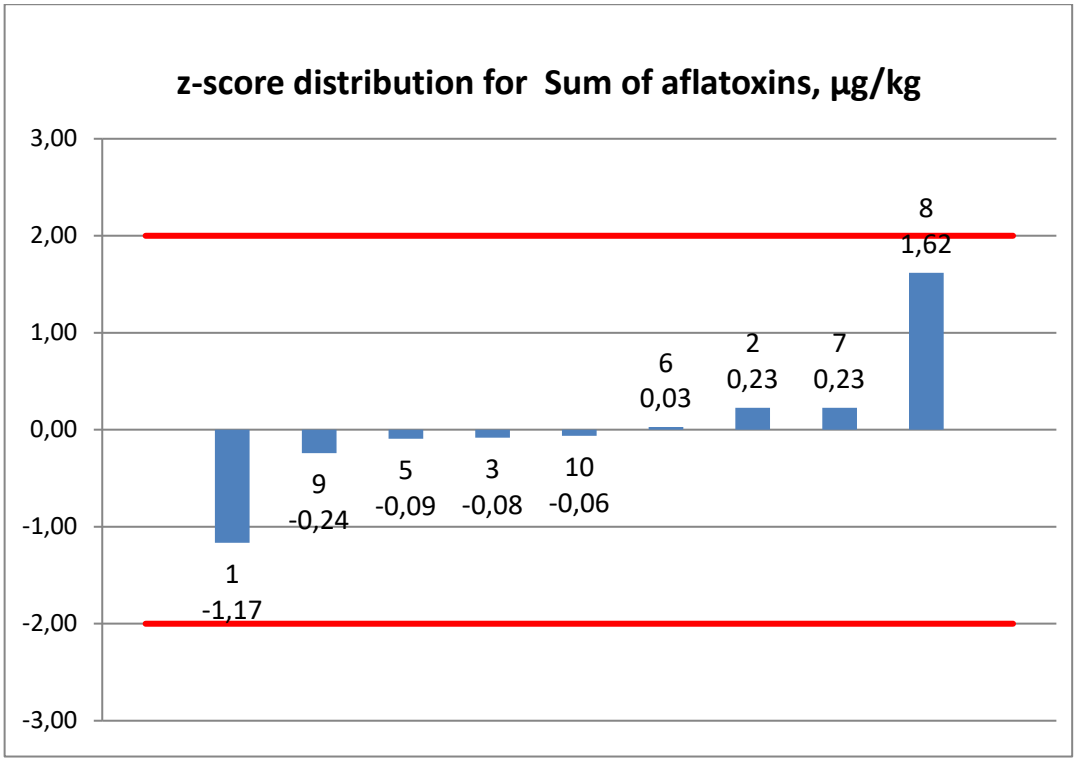
8.4. Aflatoxin G_2, µg/kg





8.5. Sum of aflatoxins, µg/kg





9. REFERENCE INFORMATION

9.1. Methods

Laboratory number	Aflatoxin B_1, µg/kg	Aflatoxin B_2, µg/kg	Aflatoxin G_1, µg/kg	Aflatoxin G_2, µg/kg	Sum of aflatoxins, µg/kg
1	Метод розроблений лабораторією (ELISA)				Метод розроблений лабораторією (ELISA)
2					ELISA
3	LC-MS/MS	LC-MS/MS	LC-MS/MS	LC-MS/MS	LC-MS/MS
4	ELISA, инструкция к тест-набору Celer AFLA B1, HU0040044, Lot 2528416661				
5	ELISA				ELISA
6	HPLC	HPLC	HPLC	HPLC	HPLC
7	HPLC-MS/MS	HPLC-MS/MS	HPLC-MS/MS	HPLC-MS/MS	HPLC-MS/MS
8					TCI MBB № 01(based on ELISA)
9	ДСТУ ISO 16050:2007	ДСТУ ISO 16050:2007	ДСТУ ISO 16050:2007	ДСТУ ISO 16050:2007	ДСТУ ISO 16050:2007
10	ISO 16050	ISO 16050	ISO 16050	ISO 16050	ISO 16050

10. 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 Guide 35:2017 Reference materials – Guidance for characterization and assessment of homogeneity and stability.
6. ILAC Discussion Paper on Homogeneity and Stability Testing, April 2008.