METROLOGY SERVICE

50006
Перевірка
професійного рівня

Director
Metrology service Ltd.

Nataliia Bozhko
September 9th 2026

PROFICIENCY TESTING PT.UA.1.12.2020

PEAS ANALYSIS (QUALITY)

PROFICIENCY TESTING REPORT

– ROUND 7 AUGUST 2026

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2. SUMMARY

2.1. The purpose of proficiency testing in peas 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.1.12.2020 ROUND 7 held in August- September 2026. This report is issued according to ISO/IEC 17043[1] and PT.UA.1.12.2020 ROUND 7 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: https://www.metrologyservice.com.ua

2.4. A total of 9 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.

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 ПП 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.1.12.2020 ROUND 7. 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 – **peas *(Písum sativum)*** were dispatched 27.07.2026 according to schedule of proficiency testing programme PT.UA.1.12.2020 ROUND 7.

3.3.2. Each produced and identified sample was additionally hermetically sealed.

3.3.3. A total of 9 participants **from two countries** received one sample. Results were returned from 9 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 target standard deviation for each analyte was chosen from either the appropriate form of the Horwitz equation, method trial standard deviation (if stated in the method from inter-laboratory comparisons), standard deviation from the previous trials (PT rounds), or the robust trial standard deviation, after the removal of outliers. The choice was made using current industry practices used in other collaborative trials and proficiency testing schemes.

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

3.5.5. All results in this round were considered to be satisfactory. 1.33% (1 result) of all results were considered to be unsatisfactory in Round 6.

3.5.6. Participant №1, Participant №3, Participant №5, Participant №8 та Participant №9 reported results for the parameter «Inorganic impurities, %» (ISO 605:1991/ ДСТУ ISO 605:2007)

as «0,00»; Participant №10 as «не виявлено». These results were assessed by the Provider as "Satisfactory (S)".

3.5.7. Participant №6 stated result for «Grain impurities, %» and for «Foreign impurities, %» according to the «МВВ ГОСТ 30483-97» method instead of the «ГОСТ 30483-97/ ДСТУ 4523:2006» proposed by the Provider.

Stated result for «Small seeds, % (seeds that passed through a 5.0 mm sieve and remained on a 4.0 mm sieve)» according to the «МВВ ГОСТ 30483-97» method instead of the «ДСТУ 4523:2006» proposed by the Provider. These results were assessed by the Provider and were taken into account when calculating robust mean and robust SD.

4. HOMOGENITY AND STABILITY ASSESMENT

4.1. Samples were assessed for homogeneity and stability after blending and packing by selecting three (Sample and Sample A) samples of material at random from all those produced. All of these samples were tested in duplicate under repeatability conditions and stability as only 24 (Sample) and 9 (Sample A) samples were produced according to [6].

4.2. Homogeneity and stability were deemed satisfactory only if 100% of results are identical with intended results, i.e. with “Satisfactory (S)” result.

4.2.1. Homogeneity and stability for ДСТУ 4523:2006 «Color»

Sample N	**Method: ДСТУ 4523:2006**	**Satisfactory/ Not satisfactory**
	Color	
1	Yellow, various shades, plain	**«Satisfactory (S)»**
2	Yellow, various shades, plain	**«Satisfactory (S)»**
3	Yellow, various shades, plain	**«Satisfactory (S)»**

Homogeneity and stability confirmed by 100% of satisfactory results.

4.2.2. Homogeneity and stability for ISO 605:1991 «Odor»

Sample N	**Method: ISO 605:1991**	**Satisfactory/ Not satisfactory**
	Odor	
1	Absence foreign odour	**«Satisfactory (S)»**
2	Absence foreign odour	**«Satisfactory (S)»**
3	Absence foreign odour	**«Satisfactory (S)»**

Homogeneity and stability confirmed by 100% of satisfactory results.

4.2.3. Homogeneity and stability for ISO 605:1991/ДСТУ ISO 605:2007 «Inorganic impurities, %»

Sample N	**Method: ISO 605:1991/ ДСТУ ISO 605:2007**	**Satisfactory/ Not satisfactory**
	Inorganic impurities, %	
1	Not detected	**«Satisfactory (S)»**
2	Not detected	**«Satisfactory (S)»**
3	Not detected	**«Satisfactory (S)»**

Homogeneity and stability confirmed by 100% of satisfactory results.

4.3. 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].

4.4. Produced samples were found to be sufficiently homogeneous and stable for every analyte according to programme, except for those that can be considered equivalent or homogeneity can be assumed from other analyte homogeneity.

4.4. Moisture content, % (ISO 24557:2024)

Moisture content, %	ISO 24557:2024									
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	13,40	13,40	13,400	0,0000	0,00	1	13,40	13,40	26,80	0,0000
2	13,37	13,32	13,345	0,0012	0,00	2	13,37	13,32	26,69	0,0025
3	13,38	13,44	13,410	0,0018	0,00	3	13,38	13,44	26,82	0,0036
										0,0061
Mean	13,385		Worst pair	0,0018		Mean	13,385			
Max	13,44		SUM of SD²	0,0030		Max	13,44			
Min	13,32		C	0,5902		Min	13,32			
			Ccr, 5%	0,9669						
			Ccr, 1%	0,9933		Analytical variance S²an	0,0010	SD	0,0399	
			Conclusion			Sanal	0,0319	RSDR	0,2979	
			5%	PASS		Ssums	0,0049			
			1%	PASS		MSb	0,0025			
					Between sample variance S²sam		0,0007			
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	0,3659
	120ppb<C<13.8%, HORWITZ	0,3623
	C<120 ppb	2,9447
MASS NEGATIVE POWER FOR HORWITZ EQUATION(%=2, ppb=9,ppm=6)		2
	SD	0,0364
1	Trial SD	0,2200
	Target SD chosen	0,2200
	σ²all	0,0044
	Replicates	3
	F1	2,996
	F2	4,276
	Critical value	0,0174
	Between sample variance S²sam	0,0007
	Sufficient homogenity test	PASS

4.5. Data for all analytes

	Sample								Sample A
	ISO 24557:2024	ISO 20483:2013/ ДСТУ ISO 20483:2016/ ДСТУ EN ISO 20483:2022 (EN ISO 20483:2013, IDT; ISO 20483:2013, IDT)	ISO 605:1991/ ДСТУ ISO 605:2007	ISO 605:1991/ ДСТУ ISO 605:2007	ДСТУ 4523:2006	ГОСТ 13586.5-93 (based on)	ГОСТ 30483-97/ ДСТУ 4523:2006	ГОСТ 30483-97/ ДСТУ 4523:2006	ISO 605:1991/ ДСТУ ISO 605:2007
	Moisture content, %	Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25)	Defective seeds, % (of the same species)	Organic impurities, %	Small seeds, % (seeds that passed through a 5.0 mm sieve and remained on a 4.0 mm sieve)	Moisture content, %	Grain impurities, %	Foreign impurities, %	Seeds typical of the species and variety,%
Homogenity and stability (Гомогенність та стабільність)									
Cohran's 'C' test (С-тест "Кохрана")									
Crtitical value (5%,3pairs)=0,9669	0,5902	0,7193	0,8652	0,5000	0,7619	0,5538	0,8980	0,7619	0,7650
Mean Result	13,3850	23,1300	4,6650	0,1400	0,3800	13,1917	4,7433	0,0850	97,2800
Conclusion (Висновок)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Analytical variance test (тест аналітичної дисперсії)									
S^2anal	0,0010	0,0252	0,0278	0,0005	0,0014	0,0011	0,0268	0,0004	0,1844
Sanal	0,0319	0,1589	0,1668	0,0231	0,0374	0,0329	0,1637	0,0187	0,4294
S^2sample	0,0007	0,0000	0,0148	0,0000	0,0000	0,0026	0,0426	0,0000	0,0000
σ_p	0,2200	0,4600	0,1480	0,0075	0,0176	0,3579	0,1501	0,0049	0,9863
σ_p source	Method Tr SD	Method Tr SD	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz
σ^2all	0,0044	0,0190	0,0020	0,00001	0,00003	0,0115	0,0020	0,000002	0,0876
Critical value	0,0174	0,1649	0,1248	0,00230	0,00607	0,0392	0,1207	0,001503	1,0508
Conclusion (Висновок)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

5. DATA SUMMARY

Method	Sample											Sample A
	ISO 24557:2024	ISO 20483:2013/ ДСТУ ISO 20483:2016/ ДСТУ EN ISO 20483:2022 (EN ISO 20483:2013, IDT; ISO 20483:2013, IDT)	ISO 605:1991/ ДСТУ ISO 605:2007	ISO 605:1991/ ДСТУ ISO 605:2007	ISO 605:1991/ ДСТУ ISO 605:2007	ДСТУ 4523:2006	ГОСТ 13586.5-93 (based on)	ГОСТ 30483-97/ ДСТУ 4523:2006	ГОСТ 30483-97/ ДСТУ 4523:2006	ДСТУ ISO 605:2007 (recommend ed)	ДСТУ 4523:2006 (recommend ed)	ISO 605:1991/ ДСТУ ISO 605:2007
	Moisture content, %	Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25)	Defective seeds, % (of the same species)	Organic impurities, %	Inorganic impurities, %	Small seeds, % (seeds that passed through a 5.0 mm sieve and remained on a 4.0 mm sieve)	Moisture content, %	Grain impurities, %	Foreign impurities, %	Odor	Color	Seeds typical of the species and variety,%
No of Results	6	6	6	6	6	7	7	7	7	4	4	2
No of Results |z|>3 or NS	0	0	0	0	0	0	0	0	0	0	0	0
No of Results |z|>3, % or NS,%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Mean	13,372	23,152	4,043	0,137		0,237	13,079	4,439	0,126			98,705
Min	13,260	22,790	3,620	0,100		0,050	12,700	2,960	0,060			97,410
Max	13,450	23,860	4,760	0,180		0,500	13,290	5,820	0,180			100,000
SD	0,080	0,382	0,502	0,032		0,171	0,244	1,158	0,046			1,831
Median	13,395	23,055	3,855	0,130		0,200	13,210	4,500	0,140			98,705
Robust mean (assigned value)	13,372	23,081	4,043	0,137		0,235	13,082	4,439	0,126			98,705
Robust SD	0,080	0,236	0,502	0,032		0,168	0,238	1,158	0,046			1,831
SD from method (Tr.SD)	0,22	0,46	N/A	N/A		N/A	N/A	N/A	N/A			N/A
SD from Horwitz eq.	0,362	0,480	0,131	0,007		0,012	0,355	0,142	0,007			0,994
Target SD	0,220	0,460	0,502	0,032		0,168	0,355	1,052	0,053			0,994
Source of target SD of PT	Method Tr SD	Method Tr SD	Trial SD	Trial SD		Trial SD	Horwitz	Trial SD	Trial SD			Horwitz

6. RAW DATA

Method	Sample								
	ISO 24557:2024	ISO 20483:2013/ ДСТУ ISO 20483:2016/ ДСТУ EN ISO 20483:2022 (EN ISO 20483:2013, IDT; ISO 20483:2013, IDT)	ISO 605:1991/ ДСТУ ISO 605:2007	ISO 605:1991/ ДСТУ ISO 605:2007	ISO 605:1991/ ДСТУ ISO 605:2007	ДСТУ 4523:2006	ГОСТ 13586.5-93 (based on)	ГОСТ 30483-97/ ДСТУ 4523:2006	ГОСТ 30483-97/ ДСТУ 4523:2006
Laboratory number	Moisture content, %	Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25)	Defective seeds, % (of the same species)	Organic impurities, %	Inorganic impurities, %	Small seeds, % (seeds that passed through a 5.0 mm sieve and remained on a 4.0 mm sieve)	Moisture content, %	Grain impurities, %	Foreign impurities, %
1	13,45	23,25	4,55	0,13	0,00	0,42	13,25	4,76	0,08
2						0,20	13,00	5,80	0,10
3	13,29	22,9	3,68	0,13	0,00	-	-	-	-
4									
5	13,26	23,0	3,62	0,11	0,00	-	-	-	-
6	13,44	23,11				0,15	13,29	3,05	0,17
7						0,27	12,7	4,18	0,18
8	13,42	22,79	4,03	0,10	0,00	0,05	13,29	2,96	0,06
9	13,37		4,76	0,18	0,00	0,50	13,21	5,82	0,14
10		23,86 ±0,11	3,62 ±0,01	0,17 ±0,01	не виявлено	0,07	12,81 ±0,08	4,50 ±0,01	0,15 ±0,01

Method	Sample		Sample A
	ДСТУ ISO 605:2007 (recommended)	ДСТУ 4523:2006 (recommended)	ISO 605:1991/ ДСТУ ISO 605:2007
Laboratory number	Odor	Color	Seeds typical of the species and variety,%
1	Нормальний, властивий здоровому зерну	Жовтий, різних відтінків, однотонний	97,41
2	Нормальний, властивий здоровому зерну	Жовтий, різних відтінків, однотонний	100,00
3	-	-	-
4			
5	-	-	-
6			
7	Нормальний, властивий здоровому зерну	Жовтий, різних відтінків, однотонний	
8	Typical of normal grain	Yellow, various shades, plain	
9			
10			

7. Z SCORES

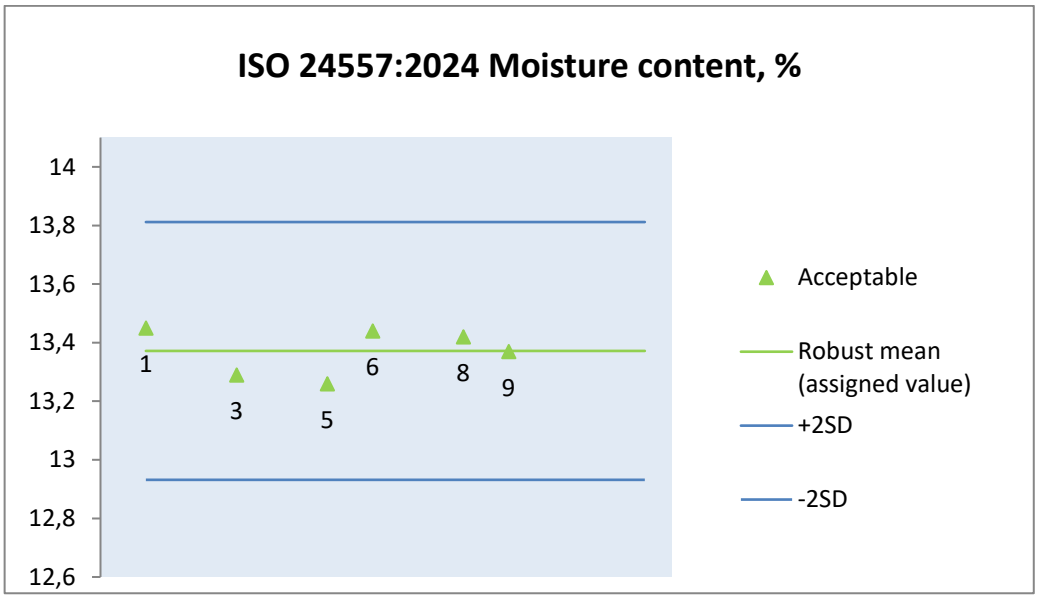
Sample												Sample A
Method	ISO 24557:2024	ISO 20483:2013/ ДСТУ ISO 20483:2016/ ДСТУ EN ISO 20483:2022 (EN ISO 20483:2013, IDT; ISO 20483:2013, IDT)	ISO 605:1991/ ДСТУ ISO 605:2007	ISO 605:1991/ ДСТУ ISO 605:2007	ISO 605:1991/ ДСТУ ISO 605:2007	ДСТУ 4523:2006	ГОСТ 13586.5-93 (based on)	ГОСТ 30483-97/ ДСТУ 4523:2006	ГОСТ 30483-97/ ДСТУ 4523:2006	ДСТУ ISO 605:2007 (recommend ed)	ДСТУ 4523:2006 (recommend ed)	ISO 605:1991/ ДСТУ ISO 605:2007
Laboratory number	Moisture content, %	Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25)	Defective seeds, % (of the same species)	Organic impurities, %	Inorganic impurities, %	Small seeds, % (seeds that passed through a 5.0 mm sieve and remained on a 4.0 mm sieve)	Moisture content, %	Grain impurities, %	Foreign impurities, %	Odor	Color	Seeds typical of the species and variety,%
1	0,36	0,37	1,01	-0,21	S	1,10	0,47	0,31	-0,86	S	S	-1,30
2						-0,21	-0,23	1,29	-0,49	S	S	1,30
3	-0,37	-0,39	-0,72	-0,21	S							
4												
5	-0,51	-0,18	-0,84	-0,83	S							
6	0,31	0,06				-0,51	0,58	-1,32	0,84			
7						0,21	-1,08	-0,25	1,02	S	S	
8	0,22	-0,63	-0,03	-1,14	S	-1,10	0,58	-1,41	-1,24	S	S	
9	-0,01		1,43	1,35	S	1,58	0,36	1,31	0,27			
10		1,69	-0,84	1,04	S	-0,99	-0,77	0,06	0,46			

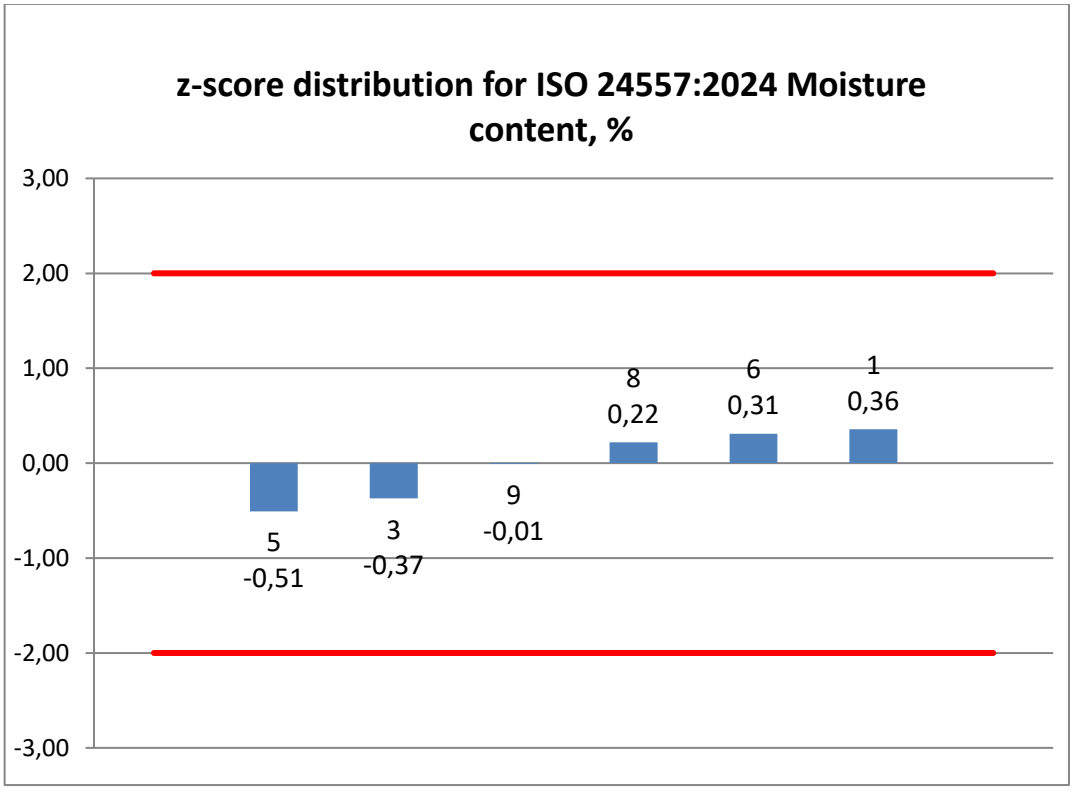
Remarks

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

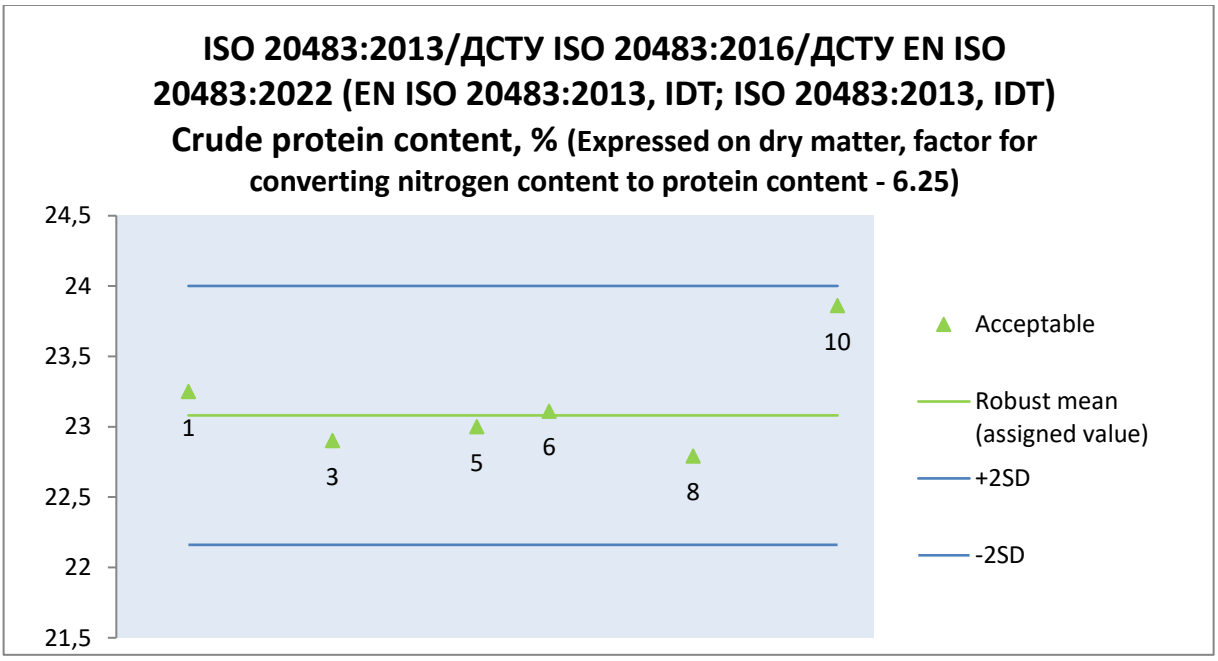
8. Z SCORE PLOTS AND RESULTS CHARTS.

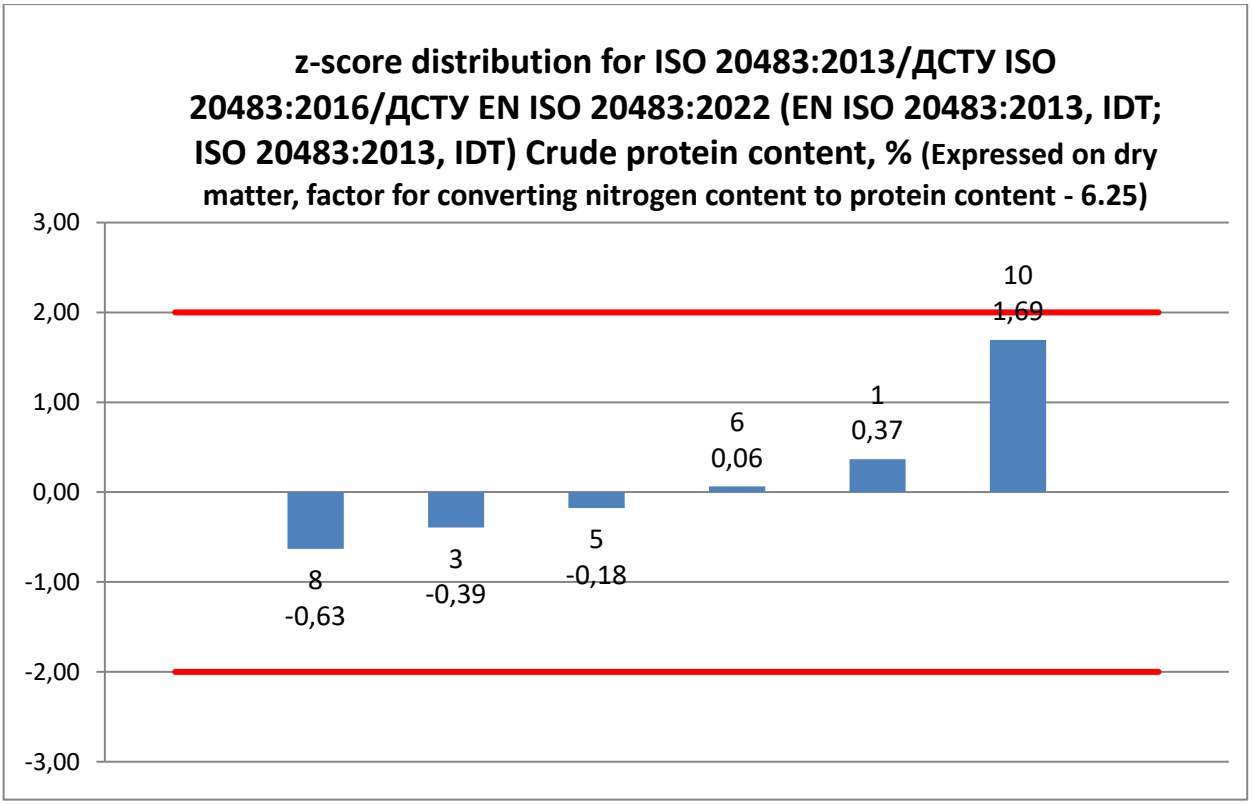
8.1. ISO 24557:2024 Moisture content, %



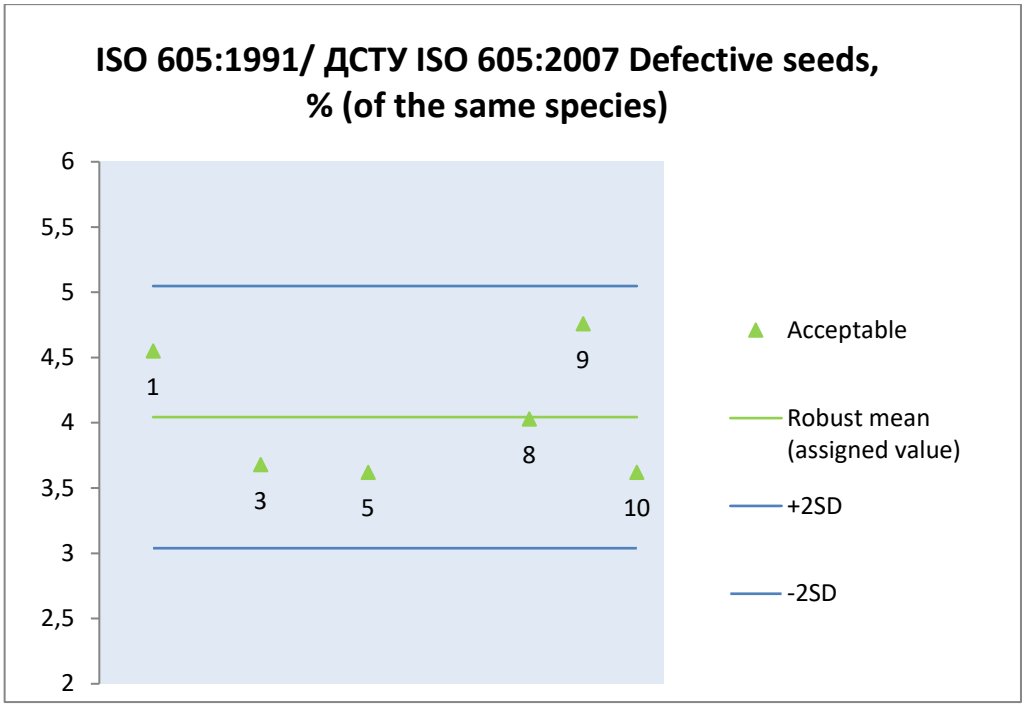


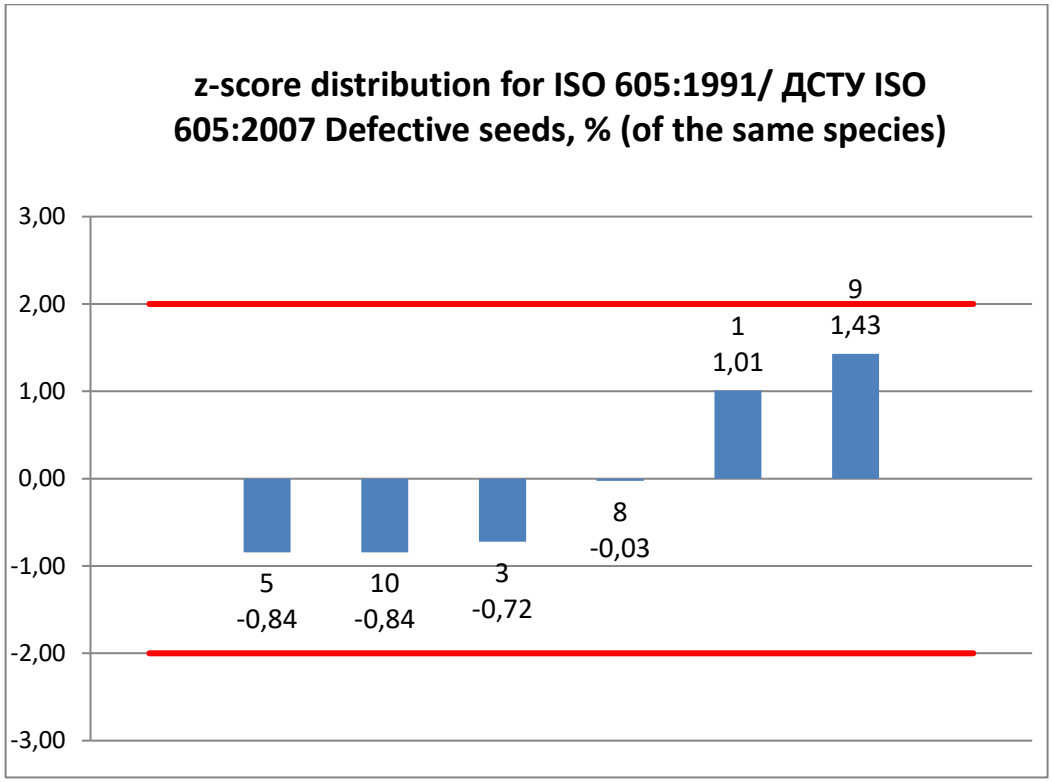
8.2. ISO 20483:2013/ДСТУ ISO 20483:2016/ДСТУ EN ISO 20483:2022 (EN ISO 20483:2013, IDT; ISO 20483:2013, IDT) Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25.)



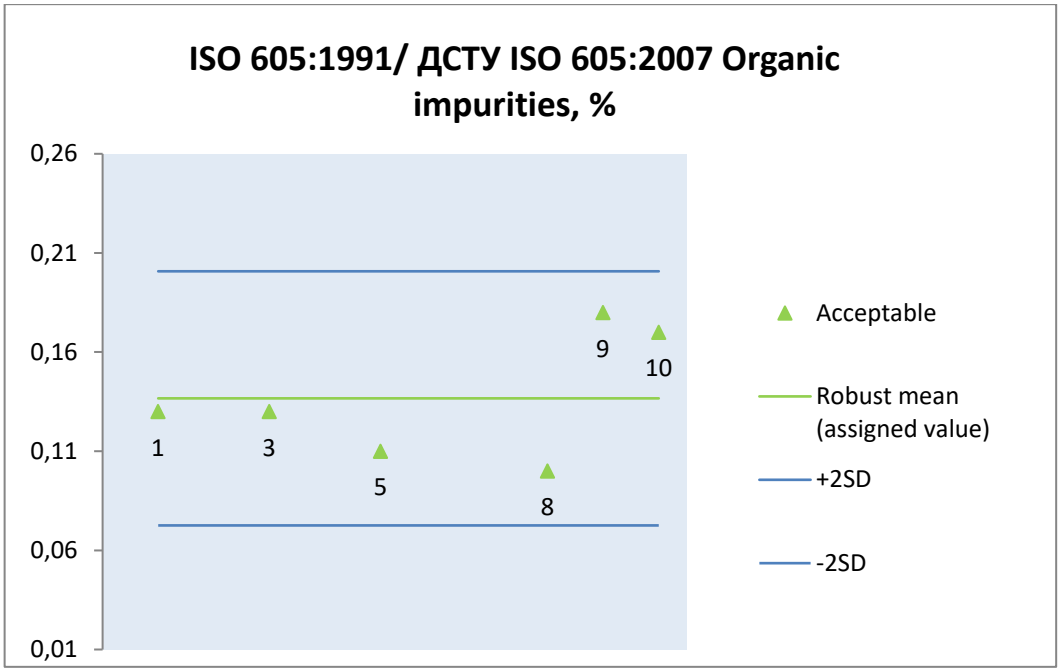


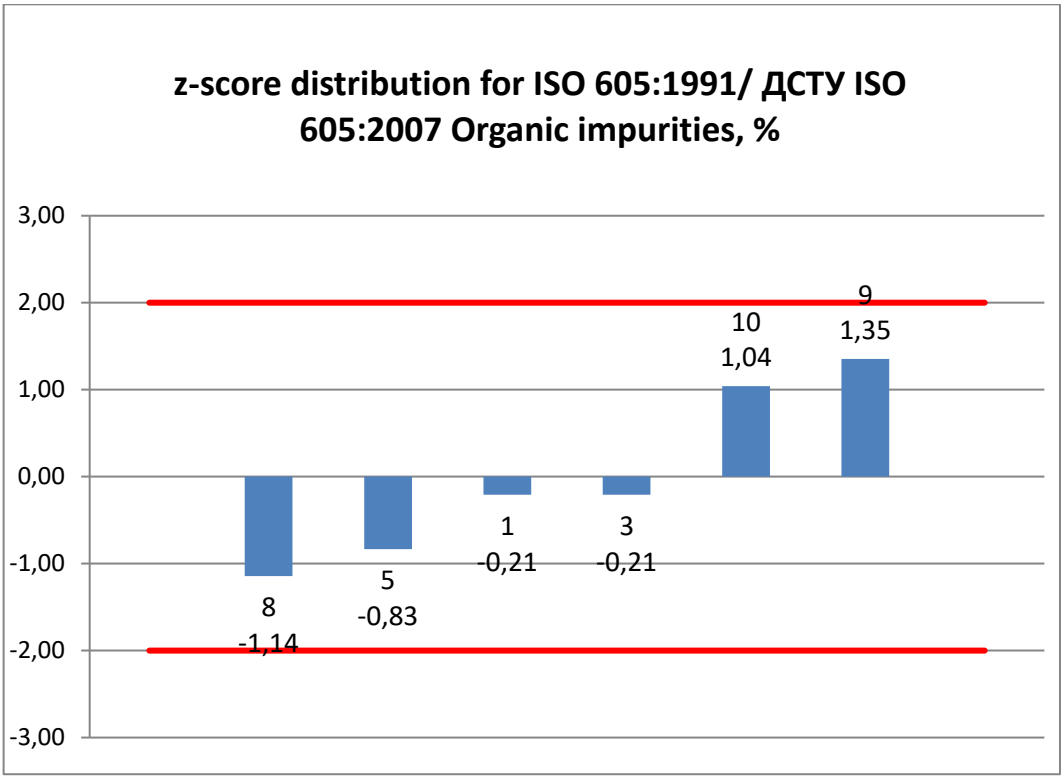
8.3. ISO 605:1991/ ДСТУ ISO 605:2007 Defective seeds, %



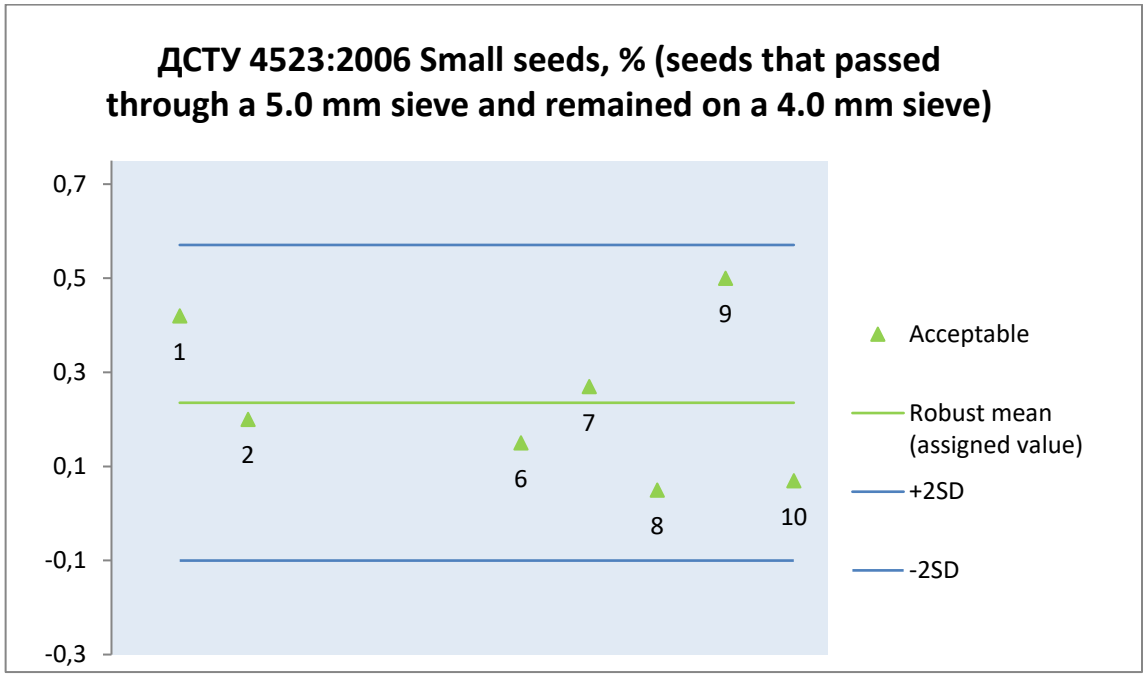


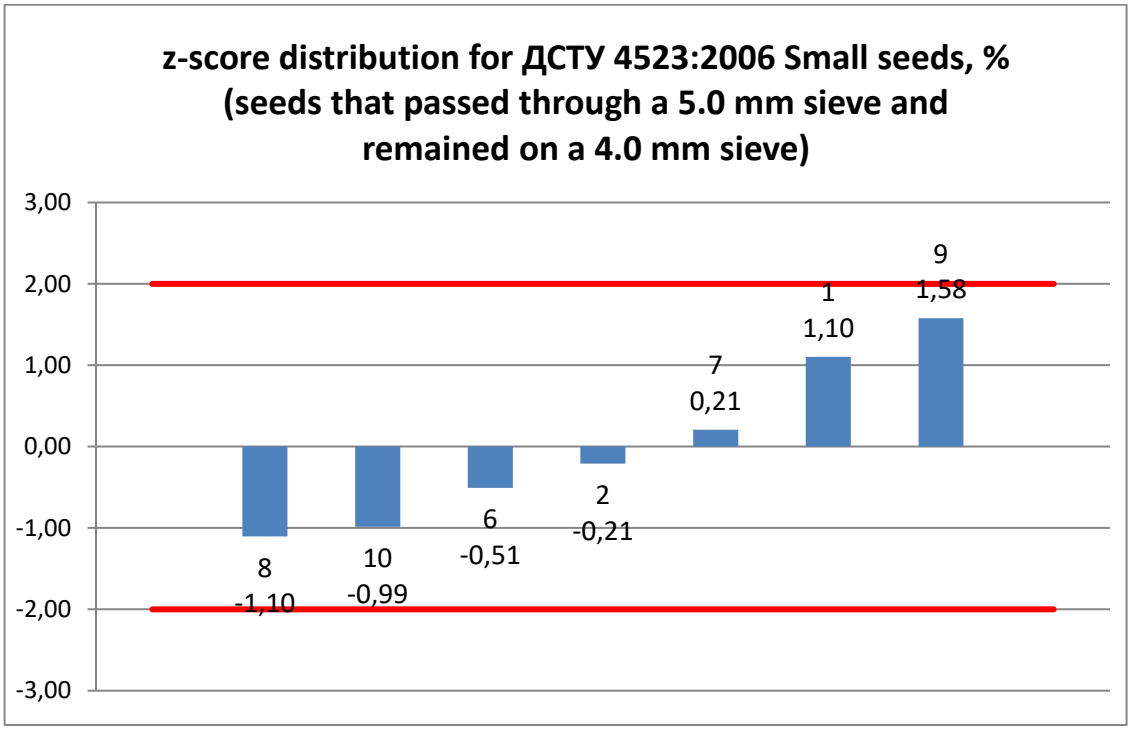
8.4. ISO 605:1991/ ДСТУ ISO 605:2007 Organic impurities, %



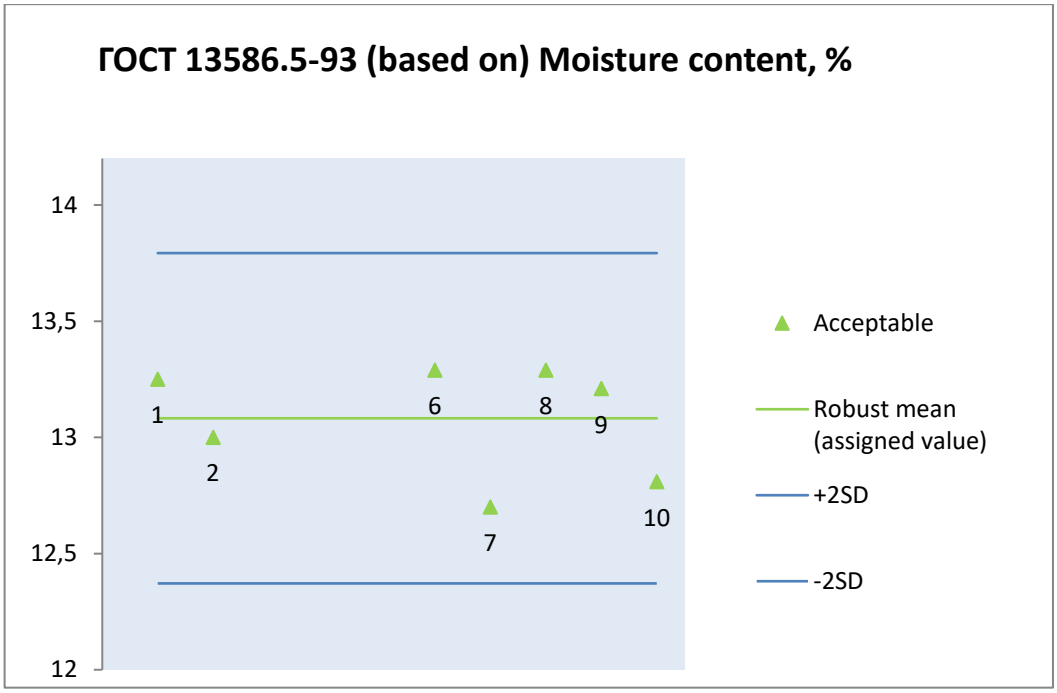


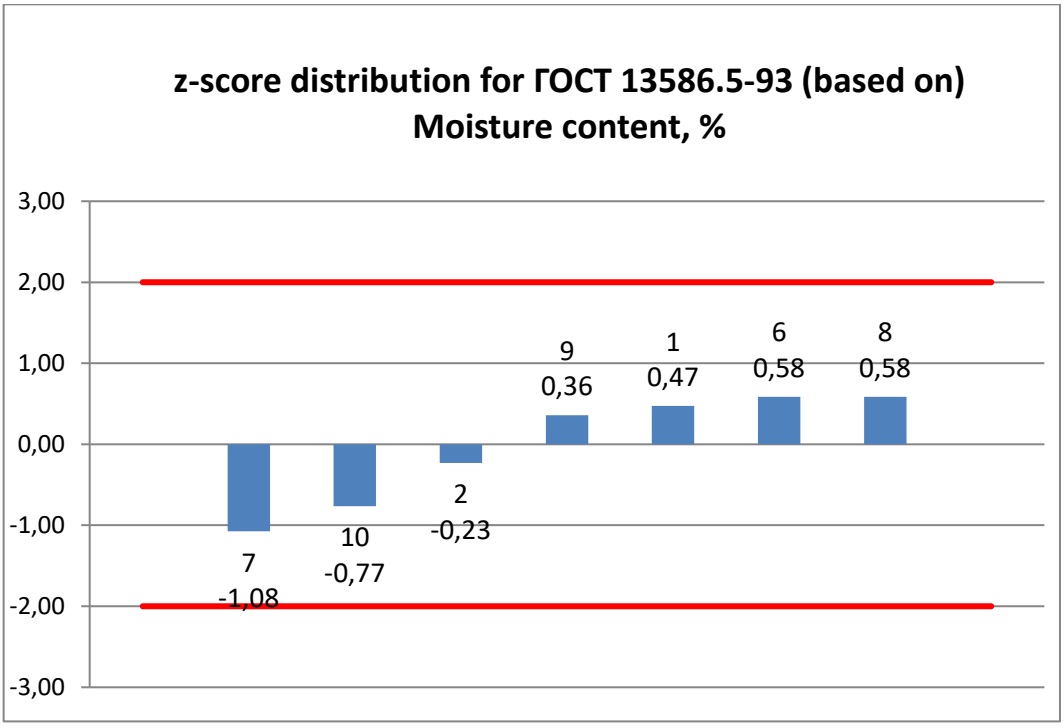
8.5. ДСТУ 4523:2006 Small seeds, % (seeds that passed through a 5.0 mm sieve and remained on a 4.0 mm sieve)



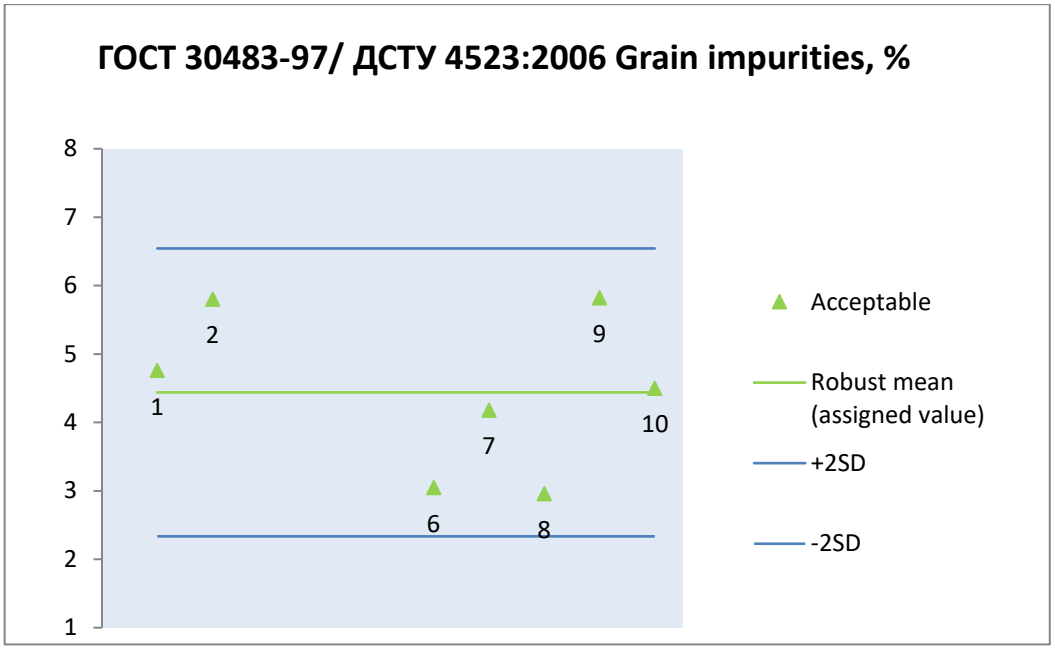


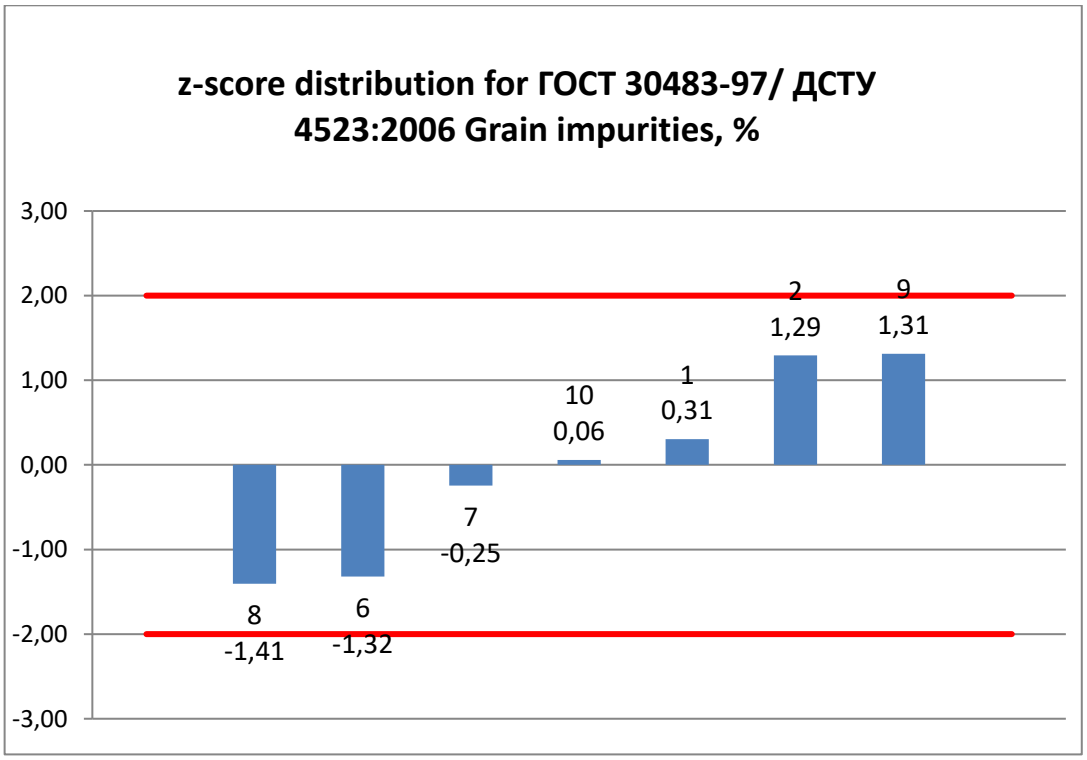
8.6. ГОСТ 13586.5-93 (based on) Moisture content, %



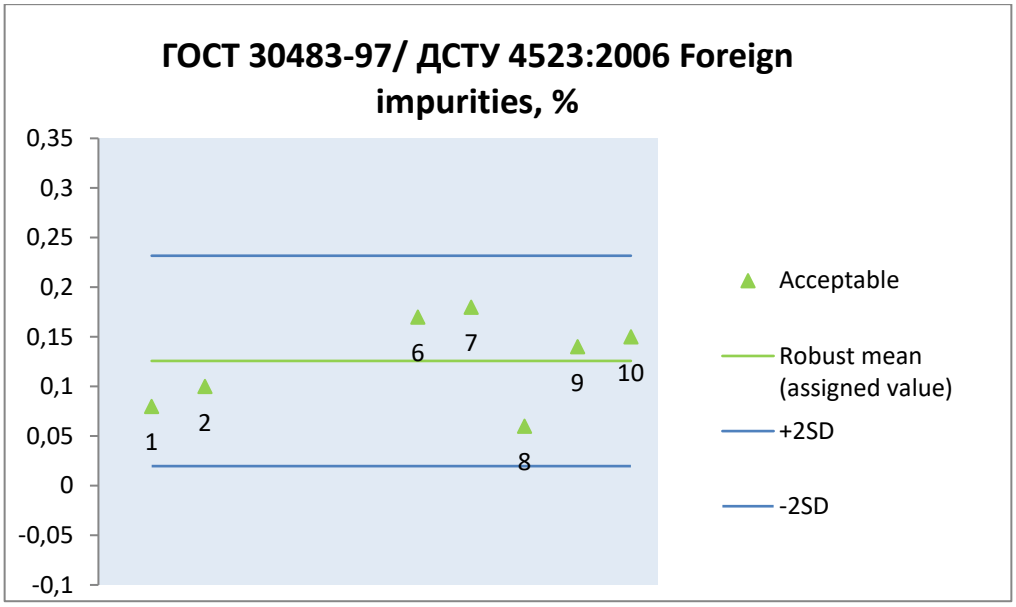


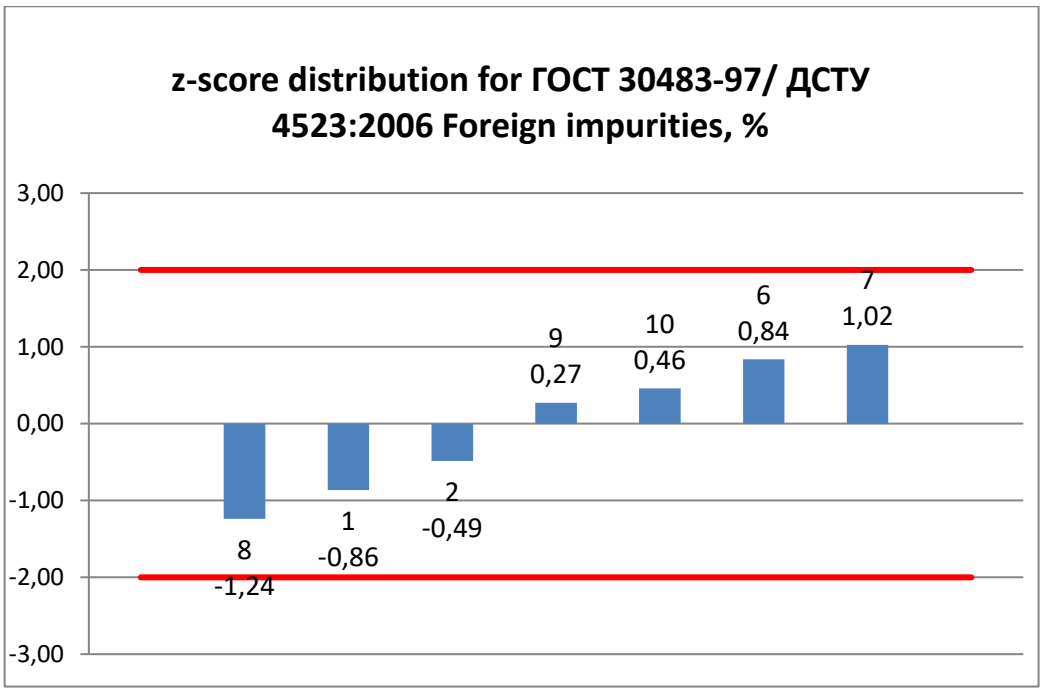
8.7. ГОСТ 30483-97/ ДСТУ 4523:2006 Grain impurities, %



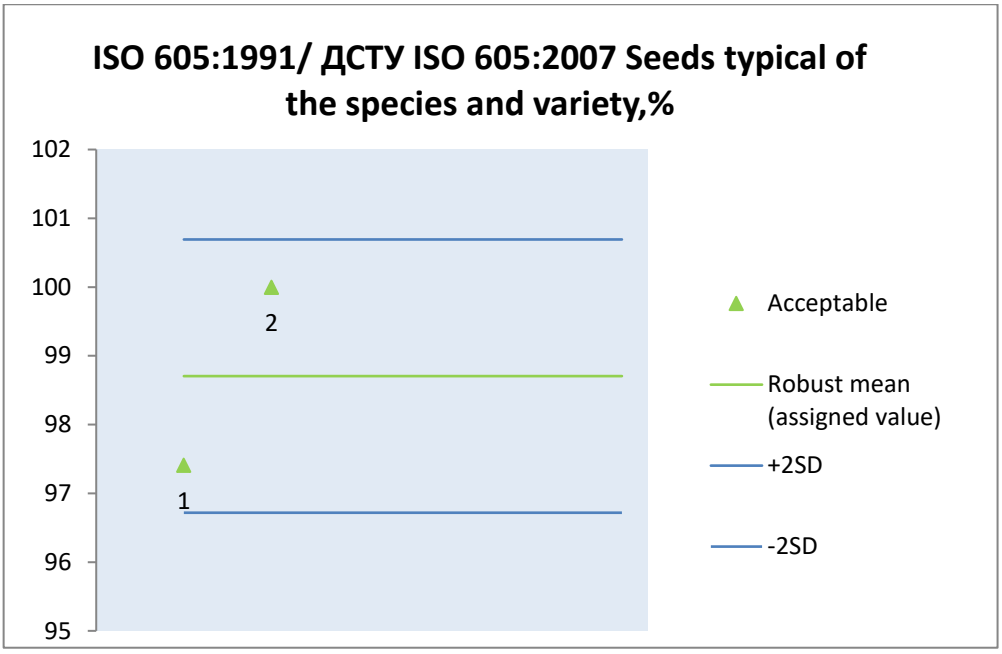


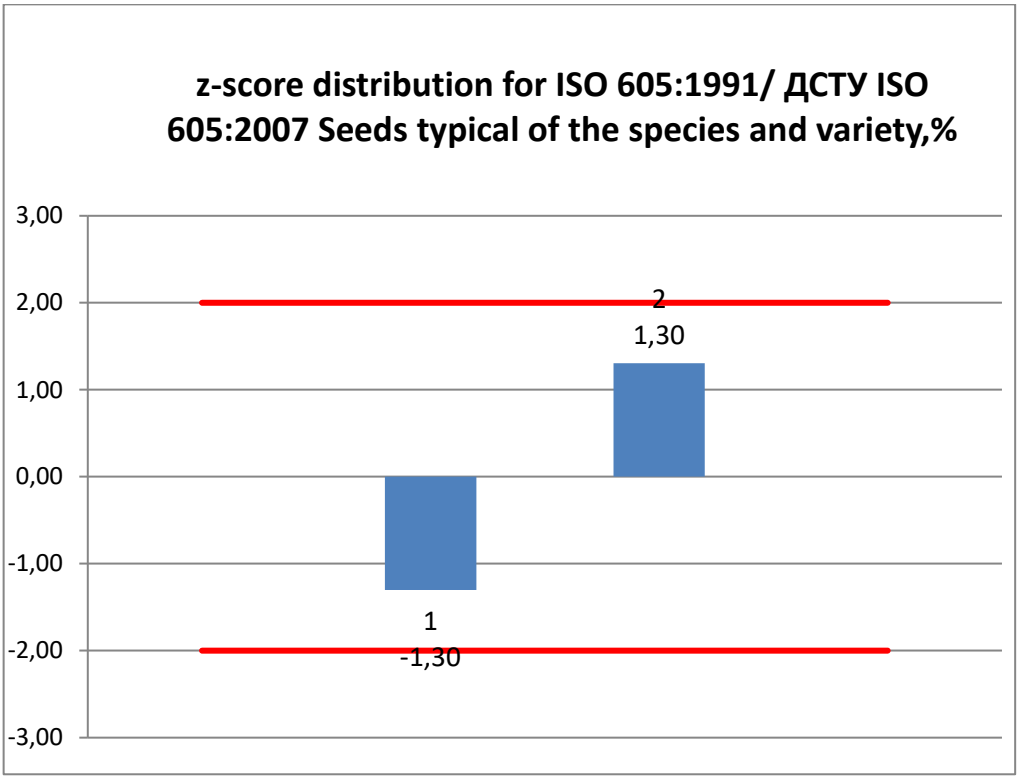
8.8. ГОСТ 30483-97/ ДСТУ 4523:2006 Foreign impurities, %





8.9. Sample A. ISO 605:1991/ДСТУ ISO 605:2007 Seeds typical of the species and variety,%





9. 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.