



50006
Перевірка
професійного рівня

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**PROFICIENCY TESTING PT.UA.1.3.2016
ANIMAL FEEDING STUFFS (QUALITY)
PROFICIENCY TESTING REPORT –
ROUND 15 DECEMBER 2025**

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2. SUMMARY

2.1. The purpose of proficiency testing in animal feeding stuffs 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. This proficiency testing program is a sequential participation schemes according to A.2 of appendix A ISO/IEC 17043[1]. Current PT scheme is registered in the EPTIS database.

2.3. This is the final report on the PT.UA.1.3.2016 Round 15 held in November-December 2025. This report is issued according to ISO/IEC 17043[1] and PT.UA.1.3.2016 Round 15 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 32 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. 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.

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 Пр.ПК02-2017 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.1.3.2016 Round 15. 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.

3.3. DISPATCH AND RECEIPT OF SAMPLES

3.3.1. Samples of test material – **Sunflower meal** were dispatched 03.11.2025 according to schedule of proficiency testing programme PT.UA.1.3.2016 Round 15.

3.3.2. Each produced and identified sample was hermetically sealed in two plastic bags. Samples for the testing of hexane were packed in a glass container with paraffin for extra hermitization and identified as Sample A.

3.3.3. A total of 32 participants in **4 countries** received one sample. 12 participants, according to their applications, additionally received samples (Sample A) for hexane testing. Results were returned from 32 participants.

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 e-mail 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. Only 1,35% (4 results) of all results in this round is considered to be unsatisfactory. In previous round there were 0,45% (1 result) unsatisfactory results.

3.5.6. Participant №19 stated the results for: «Total residual hexane content, mg/kg» according to «COY 15.4-37-214:2004» method instead of the «ISO 8892:1987» proposed by the Provider, and «Free residual hexane content, mg/kg» according to «COY 15.4-37-214:2004» method instead of the «ISO 9289:1991/ ДСТУ ISO 9289:2008» proposed by the Provider. These results were assessed by the Provider but were not taken into account when calculating robust mean and robust SD.

3.5.7. Participant №29 stated the result for «Peroxide value of oil, $\frac{1}{2}$ O mmol/kg» according to the method developed by the laboratory instead of the «ДСТУ 8659:2016» proposed by the Provider. This result was assessed by the Provider but was not 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 five samples of material at random from all those produced. Three of these samples were tested in duplicate under repeatability conditions as only 42 samples were produced according to [6]. Two other samples for stability tests were stored in appropriate conditions for the period of preparation and test submission for this round. They were also tested in duplicate. Based on the experience of previous rounds, considering the risks, the Provider deemed samples A to be homogeneous for the relevant parameters.

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 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 771:2021/ ДСТУ ISO 771:2006

Moisture content, %		ISO 771:2021/ДСТУ ISO 771:2006									
Дослідження гомогенності/ Homogeneity test											
Аналіз викидів за тестом Кохрана(C -тест)/Cohran's C test for outliers						Аналіз на 'достатню однорідність'/Test for 'sufficient homogeneity'					
Sample number	Результат/ Result A	Результат/ Result B	Average	SD ²	Номер зразку /Sample number	Результат/ Result A	Результат/ Result B	SUM	Difference ²		
1	9,680	9,680	9,680	0,0000	0,00	1	9,68	9,68	19,36	0,0000	
2	9,690	9,690	9,690	0,0000	0,00	2	9,69	9,69	19,38	0,0000	
3	9,620	9,660	9,640	0,0008	0,00	3	9,62	9,66	19,28	0,0016	
4	9,720	9,750	9,735	0,0004	0,00	4	9,72	9,75	19,47	0,0009	
5	9,750	9,780	9,765	0,0004	0,00	5	9,75	9,78	19,53	0,0009	
											0,0034
Mean	9,702		Worst pair	0,0008	Mean	9,702					
Max	9,78		SUM of SD ²	0,0017	Max	9,78					
Min	9,62		C	0,4706	Min	9,62					
			Ccr, 5%	0,8413							
			Ccr, 1%	0,9279	Analytical variance S ² ar	0,0003	SD		0,0480		
			Conclusion		Sanal	0,0184	RSDR		0,4950		
			5% PASS		Ssums	0,0095					
			1% PASS		MSb	0,0048					
					Between sample variance S ² sam	0,0022					
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 σ_p value to use	σ_p
Use(write '1') Source	
C>13.8%, HORWITZ	0,3115
1 120ppb<C<13.8%, HORWITZ	0,2757
C<120 ppb	2,1344
MASS NEGATIVE POWER FOR HORWITZ EQUATION(%=2, ppb=9,ppm=6)	2
SD	0,0456
Trial SD	0,2770
Target SD chosen	0,2757
σ^2 all	0,0068
Replicates	5
F1	2,372
F2	2,096
Critical value	0,0169
Between sample variance S ² sam	0,0022
Sufficient homogeneity test	PASS

4.5. Data for all analytes

Method	ISO 771:2021/ ДСТУ ISO 771:2006	ISO 5983-1:2005/ ДСТУ EN ISO 5983- 1:2022 (EN ISO 5983- 1:2005, IDT; ISO 5983-1:2005, IDT)/ Amendment № 1:2022 (EN ISO 5983-1:2005/ AC:2009, IDT; ISO 5983-1:2005/ Cor 1:2008, IDT)	ISO 14244:2014	ISO 5984:2022/ ДСТУ ISO 5984:2004	ISO 5985:2002/ ДСТУ ISO 5985:2004	ISO 734:2023/ ДСТУ ISO 734- 1:2008	ISO 6865:2000/ ДСТУ EN ISO 6865:2022 (EN ISO 6865:2000, IDT; ISO 6865:2000, IDT)	ДСТУ 7618:2014	ДСТУ 8659:2016	ISO 6495-1:2015/ ДСТУ ISO 6495:2005
	Moisture content, %	Crude protein content, % (Expressed as a mass fraction of the product as received)	Soluble proteins in potassium hydroxide solution, g of soluble proteins per 100 g of the total protein	Crude ash, % (Expressed as a mass fraction of the product as received)	Ash insoluble in hydrochloric acid, % (Expressed as a mass fraction of the product as received)	Fat content, % (Expressed as a mass fraction of the product as received)	Crude fibre content, % (Expressed as a mass fraction of the product as received)	Acid value of oil, mg KOH/g	Peroxide value of oil, ½O mmol/kg	Water-soluble chloride content, expressed as sodium chloride, % (Expressed as a mass fraction of the product as received)

Homogeneity and stability (Гомогенність та стабільність)

Cohran's 'C' test (С-тест "Кохрана")

Critical value (5%, 5pairs)=0,8412	0,4706	0,8282	0,7880	0,4347	0,4325	0,5475	0,5505	0,6510	0,5461	0,2963
Mean Result	9,7020	36,7460	80,4800	6,1726	0,1073	0,9810	17,6170	11,0700	22,6460	0,2480
Conclusion (Висновок)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Analytical variance test (тест аналітичної дисперсії)

S ² anal	0,0003	0,0193	0,0983	0,0012	0,0000	0,0026	0,0259	0,0258	0,0041	0,0005
Sanal	0,0184	0,1390	0,3135	0,0352	0,0049	0,0513	0,1611	0,1607	0,0642	0,0232
S ² sample	0,0022	0,0000	0,2284	0,0000	0,0000	0,0053	0,0229	0,0000	0,0030	0,0000
σ _p	0,2757	0,6062	4,4700	0,1877	0,0060	0,0394	0,4197	0,3083	4,4710	0,0122
σ _p source	Horwitz	Horwitz	Method Tr SD	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz	Trial SD	Horwitz
σ ² all	0,0068	0,0331	1,7983	0,0032	0,000003	0,0001	0,0159	0,0086	1,7991	0,00001
Critical value	0,0169	0,1189	4,4714	0,0101	0,000058	0,0058	0,0920	0,0744	4,2759	0,00116
Conclusion (Висновок)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

5. DATA SUMMARY

Method	ISO 771:2021/ ДСТУ ISO 771:2006	ISO 12099:2017	ISO 5983-1:2005/ ДСТУ EN ISO 5983-1:2022 (EN ISO 5983-1:2005, IDT; ISO 5983-1:2005, IDT)/ Amendment № 1:2022 (EN ISO 5983-1:2005/ AC:2009, IDT; ISO 5983- 1:2005/ Cor 1:2008, IDT)	ISO 5983- 2:2009/ ДСТУ EN ISO 5983- 2:2022 (EN ISO 5983-2:2009, IDT; ISO 5983- 2:2009, IDT)	ISO 16634-1:2008	ISO 12099:2017	ISO 14244:2014	ISO 5984:2022/ ДСТУ ISO 5984:2004	ISO 749:1977	ISO 5985:2002/ ДСТУ ISO 5985:2004
	Moisture content, %	Moisture content, %	Crude protein content, % (Expressed as a mass fraction of the product as received)	Crude protein content, % (Expressed as a mass fraction of the product as received)	Crude protein content, % (Expressed as a mass fraction of the product as received, factor for converting nitrogen content to protein content - 6.25)	Crude protein content, % (Expressed as a mass fraction of the product as received, factor for converting nitrogen content to protein content - 6.25)	Soluble proteins in potassium hydroxide solution, g of soluble proteins per 100 g of the total protein	Crude ash, % (Expressed as a mass fraction of the product as received)	Total ash yielded by the sample as received, %	Ash insoluble in hydrochloric acid, % (Expressed as a mass fraction of the product as received)
No of Results	19	6	4	13	5	5	6	14	3	12
No of Results z >3	0	0	0	0	0	0	0	0	0	0
No of Results z >3, %	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Mean	9,784	9,782	36,508	36,245	37,084	36,440	76,307	6,354	6,223	0,102
Min	9,400	9,350	36,080	35,380	36,600	35,570	72,400	6,120	6,150	0,040
Max	10,380	9,960	36,850	37,260	37,900	36,700	79,900	6,810	6,320	0,160
SD	0,235	0,223	0,378	0,550	0,502	0,489	3,600	0,200	0,087	0,039
Median	9,770	9,865	36,550	36,170	36,950	36,650	76,455	6,315	6,200	0,105
Robust mean (assigned value)	9,748	9,836	36,508	36,242	37,024	36,616	76,307	6,318	6,223	0,102
Robust SD	0,115	0,106	0,378	0,472	0,384	0,105	3,600	0,131	0,087	0,038
SD from method (Tr.SD)	0,24	N/A	0,9	0,6	0,6875	N/A	4,47	0,11	N/A	0,034
SD from Horwitz eq.	0,277	0,279	0,604	0,602	0,608	0,605	N/A	0,191	0,189	0,006
Target SD	0,277	0,279	0,604	0,600	0,688	0,605	4,470	0,191	0,189	0,034
Source of target SD of PT	Horwitz	Horwitz	Horwitz	Method Tr SD	Method Tr SD	Horwitz	Method Tr SD	Horwitz	Horwitz	Method Tr SD

Method	ISO 734:2023/ ДСТУ ISO 734-1:2008	ISO 12099:2017	ISO 6865:2000/ ДСТУ EN ISO 6865:2022 (EN ISO 6865:2000, IDT; ISO 6865:2000, IDT)	ISO 12099:2017	ДСТУ 7618:2014	ДСТУ 7621:2014, п.5.2-5.6	ДСТУ 7491:2013	ДСТУ 7169:2010	ДСТУ 7189:2010	ДСТУ 4924:2008	ДСТУ 7491:2013	ДСТУ 8076:2015
	Fat content, % (Expressed as a mass fraction of the product as received)	Fat content, % (Expressed as a mass fraction of the product as received)	Crude fibre content, % (Expressed as a mass fraction of the product as received)	Crude fibre content, % (Expressed as a mass fraction of the product as received)	Acid value of oil, mg KOH/g	Moisture content, %	Moisture content, %	Crude protein content, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Protein content, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Mass fraction of crude protein, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Mass fraction of crude protein, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Mass fraction of soluble proteins in potassium hydroxide, %
No of Results	15	7	11	4	7	21	5	18	7	4	5	6
No of Results z >3	0	0	0	0	1	0	0	0	0	0	0	0
No of Results z >3, %	0,000	0,000	0,000	0,000	14,286	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Mean	0,904	0,867	18,108	17,795	10,977	9,756	9,716	40,128	40,459	40,230	40,244	78,637
Min	0,650	0,730	17,490	17,460	6,910	9,400	9,500	38,840	39,570	39,700	39,200	72,930
Max	1,070	0,960	19,200	18,020	14,000	10,200	9,900	41,210	41,000	40,500	41,620	84,400
SD	0,125	0,084	0,500	0,267	2,302	0,188	0,172	0,579	0,450	0,370	1,008	4,743
Median	0,870	0,880	18,100	17,850	11,150	9,740	9,710	40,190	40,500	40,360	40,500	77,780
Robust mean (assigned value)	0,910	0,871	18,059	17,795	11,174	9,749	9,716	40,159	40,528	40,230	40,244	78,637
Robust SD	0,113	0,077	0,398	0,267	1,924	0,105	0,172	0,435	0,269	0,370	1,008	4,743
SD from method (Tr.SD)	0,24	N/A	0,575	N/A	0,93	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SD from Horwitz eq.	0,037	0,036	0,425	0,422	0,311	0,277	0,276	0,634	0,637	0,634	0,634	0,887
Target SD	0,240	0,146	0,575	0,422	0,970	0,277	0,276	0,634	0,637	0,634	0,634	4,446
Source of target SD of PT	Method Tr	Trial SD	Method Tr SD	Horwitz	Trial SD	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz	Horwitz	Trial SD

Method	ГОСТ 26226-95	ДСТУ 9174:2022	ДСТУ 9174:2022	ГОСТ 13496.15-97	ДСТУ 7491:2013	ДСТУ 7458:2013	ДСТУ 8844:2019 п. 6.1.	ДСТУ 7491:2013	ДСТУ 8659:2016	ISO 6495-1:2015/ДСТУ ISO 6495:2005	ISO 8892:1987	ISO 9289:1991/ДСТУ ISO 9289:2008
	Mass fraction of crude ash, % (Expressed on absolute dry matter)	Mass fraction of crude ash, % (Expressed on absolute dry matter)	Mass fraction of ash insoluble in hydrochloric acid, % (Expressed on absolute dry matter)	Mass fraction of crude fat, % (Expressed on absolute dry matter)	Mass fraction of crude fat, % (Expressed on absolute dry matter)	Mass fraction of crude fat, % (Expressed on absolute dry matter)	Mass fraction of crude fibre, % (Expressed on absolute dry matter)	Mass fraction of crude fibre, % (Expressed on absolute dry matter)	Peroxide value of oil, $\frac{1}{2}$ O mmol/kg	Water-soluble chloride content, expressed as sodium chloride, % (Expressed as a mass fraction of the product as received)	Total residual hexane content, mg/kg	Free residual hexane content, mg/kg
No of Results	9	7	6	9	5	19	17	3	8	3	4	9
No of Results z >3	0	0	0	0	0	0	1	0	1	0	1	0
No of Results z >3, %	0,000	0,000	0,000	0,000	0,000	0,000	5,882	0,000	12,500	0,000	25,000	0,000
Mean	6,856	6,833	0,083	0,969	0,894	0,988	19,961	20,133	19,984	0,263	161,125	56,356
Min	6,750	6,760	0,020	0,780	0,800	0,760	18,780	19,500	4,100	0,210	112,000	39,300
Max	7,020	6,960	0,150	1,160	1,000	1,380	22,300	20,900	27,110	0,340	281,300	74,000
SD	0,075	0,067	0,045	0,137	0,073	0,176	0,890	0,709	7,174	0,068	80,754	10,869
Median	6,840	6,830	0,079	0,900	0,900	0,965	19,600	20,000	22,620	0,240	125,600	57,000
Robust mean (assigned value)	6,847	6,824	0,083	0,969	0,894	0,980	19,844	20,133	20,810	0,263	125,600	55,175
Robust SD	0,042	0,050	0,045	0,137	0,073	0,159	0,613	0,709	4,471	0,068	13,576	10,681
SD from method (Tr.SD)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SD from Horwitz eq.	0,205	0,204	0,005	0,039	0,036	0,039	0,445	0,449	N/A	0,013	9,708	4,827
Target SD	0,205	0,204	0,045	0,137	0,195	0,159	0,756	0,745	4,471	0,068	9,708	10,681
Source of target SD of PT	Horwitz	Horwitz	Trial SD	Trial SD	Trial SD	Trial SD	Trial SD	Trial SD	Trial SD	Trial SD	Horwitz	Trial SD

6. RAW DATA

Method	ISO 771:2021/ ДСТУ ISO 771:2006	ISO 12099:2017	ISO 5983-1:2005/ ДСТУ EN ISO 5983-1:2022 (EN ISO 5983-1:2005, IDT; ISO 5983-1:2005, IDT)/ Amendment № 1:2022 (EN ISO 5983-1:2005/ AC:2009, IDT; ISO 5983-1:2005/ Cor 1:2008, IDT)	ISO 5983-2:2009/ ДСТУ EN ISO 5983-2:2022 (EN ISO 5983-2:2009, IDT; ISO 5983-2:2009, IDT)	ISO 16634-1:2008	ISO 12099:2017	ISO 14244:2014	ISO 5984:2022/ ДСТУ ISO 5984:2004	ISO 749:1977	ISO 5985:2002/ ДСТУ ISO 5985:2004	ISO 734:2023/ ДСТУ ISO 734-1:2008	ISO 12099:2017
Laboratory number	Moisture content, %	Moisture content, %	Crude protein content, % (Expressed as a mass fraction of the product as received)	Crude protein content, % (Expressed as a mass fraction of the product as received)	Crude protein content, % (Expressed as a mass fraction of the product as received, factor for converting nitrogen content to protein content - 6.25)	Crude protein content, % (Expressed as a mass fraction of the product as received, factor for converting nitrogen content to protein content - 6.25)	Soluble proteins in potassium hydroxide solution, g of soluble proteins per 100 g of the total protein	Crude ash, % (Expressed as a mass fraction of the product as received)	Total ash yielded by the sample as received, %	Ash insoluble in hydrochloric acid, % (Expressed as a mass fraction of the product as received)	Fat content, % (Expressed as a mass fraction of the product as received)	Fat content, % (Expressed as a mass fraction of the product as received)
1	9,72	9,75	36,80		36,95	36,65	79,70	6,18	6,15	0,11	1,06	0,96
2				35,38				6,21		0,15		
3	9,63	-	36,08	36,05	-	-	-	6,68	-	0,16	-	-
4	10,20											
5	9,40			35,84							0,65	
6	9,81											
7	9,60			36,00							0,87	
8	9,73			37,26	37,90						0,91	
9	9,79			36,66				6,20	6,20		1,05	
10	9,50	9,90	-	36,70	36,80	36,70	-	6,20	-	0,14	0,80	0,83
11	10,38	9,96		36,17	37,17						0,75	0,88
12	9,80				36,60	36,70					0,95	0,90
13												
14												
15												
16	9,77							6,81		0,09		
17	9,75	9,35	-	36,70	-	35,57	73,84	6,36	-	0,07	0,86	0,81
18												
19								6,39		0,10		
20	9,77	9,83									0,85	0,96
21	9,57	-	-	36,40	-	-	72,40	6,12	-	0,05	1,01	-
22												
23												
24												
25												
26												
27	9,85	9,90	36,85	36,68		36,58	79,9	6,33	6,32	0,04	0,87	0,73
28												
29								6,28				
30	9,72		36,30					6,30		0,12	1,07	
31	10,12			35,42			72,93	6,56		0,07	1,04	
32	9,78			35,93			79,07	6,34		0,12	0,82	

Method	ISO 6865:2000/ ДСТУ EN ISO 6865:2022 (EN ISO 6865:2000, IDT; ISO 6865:2000, IDT)	ISO 12099:2017	ДСТУ 7618:2014	ДСТУ 7621:2014, п.5.2-5.6	ДСТУ 7491:2013	ДСТУ 7169:2010	ДСТУ 7189:2010	ДСТУ 4924:2008	ДСТУ 7491:2013	ДСТУ 8076:2015	ГОСТ 26226-95
Laboratory number	Crude fibre content, % (Expressed as a mass fraction of the product as received)	Crude fibre content, % (Expressed as a mass fraction of the product as received)	Acid value of oil, mg KOH/g	Moisture content, %	Moisture content, %	Crude protein content, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Protein content, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Mass fraction of crude protein, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Mass fraction of crude protein, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Mass fraction of soluble proteins in potassium hydroxide, %	Mass fraction of crude ash, % (Expressed on absolute dry matter)
1	17,50	17,46	11,15	9,68		40,83	41,00			79,80	
2				9,68						75,24	
3	18,34	-	-	-	-	-	-	-	-	-	-
4						38,84					6,84
5											
6							40,54				
7											
8											
9	19,20			9,79							6,83
10	18,10	17,70	14,00	9,70	9,50	40,55	40,40	40,50	40,50	-	6,85
11	18,33										
12				9,60			40,50		40,60		
13				10,20		41,21					
14				9,60		40,40					
15			13,09	9,92	9,87	40,06			41,62		
16						40,18					
17	18,39	18,00	-	-	9,60	40,69	-	-	39,30	-	-
18				9,70		40,10	40,40				
19				9,40		40,40	40,80				
20	17,49			10,12							
21	17,95	-	-	9,71	9,71	40,30	-	-	-	83,69	-
22				9,74		40,12					6,86
23				9,81 ± 0,01							6,91 ± 0,01
24				9,83							6,75
25				9,77		39,52					6,81
26				9,81							6,83
27	17,77	18,02	11,28	9,88		40,33		40,47		84,4	
28				9,40	9,90	39,55			39,20		
29			6,91	9,80		39,20					
30			9,80	9,73		40,20		40,25			
31	18,40		10,61							72,93	
32	17,72					39,82	39,57	39,70		75,76	7,02

Method	ДСТУ 9174:2022	ДСТУ 9174:2022	ГОСТ 13496.15-97	ДСТУ 7491:2013	ДСТУ 7458:2013	ДСТУ 8844:2019 п. 6.1.	ДСТУ 7491:2013	ДСТУ 8659:2016	ISO 6495-1:2015/ДСТУ ISO 6495:2005	ISO 8892:1987	ISO 9289:1991/ДСТУ ISO 9289:2008
Laboratory number	Mass fraction of crude ash, % (Expressed on absolute dry matter)	Mass fraction of ash insoluble in hydrochloric acid, % (Expressed on absolute dry matter)	Mass fraction of crude fat, % (Expressed on absolute dry matter)	Mass fraction of crude fat, % (Expressed on absolute dry matter)	Mass fraction of crude fat, % (Expressed on absolute dry matter)	Mass fraction of crude fibre, % (Expressed on absolute dry matter)	Mass fraction of crude fibre, % (Expressed on absolute dry matter)	Peroxide value of oil, ½O mmol/kg	Water-soluble chloride content, expressed as sodium chloride, % (Expressed as a mass fraction of the product as received)	Total residual hexane content, mg/kg	Free residual hexane content, mg/kg
1	6,86	0,11			1,17	19,42		22,70	0,24	135,20	67,60
2			0,90			21,35					
3	-	-	-	-	-	-	-	-	-	-	-
4			0,89								
5											
6			0,90			19,56					
7											
8											
9	6,83		1,16		1,16						
10	6,85	0,15	0,90	0,91	0,92	19,60	19,50	-	-	116,00	49,00
11											
12				1,00	1,00	20,50					
13					1,15						
14					1,38	22,30		4,10			
15				0,86	0,97			17,30			
16					1,07	19,11					74,00
17	-	-	-	0,90	-	20,54	20,00	22,54	-	281,30	47,30
18					0,78	19,60					
19					0,98	19,30				112,00	63,00
20	6,76	0,08			0,95	19,46					51
21	6,78	0,06	-	-	1,14	18,78	-	18,10	-	-	57,00
22					0,76						
23					0,78 ± 0,01						
24											
25					0,76						
26					0,78						
27	6,96	0,02			0,95	19,85			0,21		59,00
28	6,79	0,077	0,78	0,80		20,47	20,90				
29					0,90	19,82		24,20			
30			1,12		1,18	19,20		23,82			
31			1,15			20,47		27,11	0,34		39,30
32			0,92								

7. Z SCORES

Method	ISO 771:2021/ ДСТУ ISO 771:2006	ISO 12099:2017	ISO 5983-1:2005/ ДСТУ EN ISO 5983-1:2022 (EN ISO 5983-1:2005, IDT; ISO 5983-1:2005, IDT)/ Amendment № 1:2022 (EN ISO 5983-1:2005/ AC:2009, IDT; ISO 5983-1:2005/ Cor 1:2008, IDT)	ISO 5983-2:2009/ ДСТУ EN ISO 5983-2:2022 (EN ISO 5983-2:2009, IDT; ISO 5983-2:2009, IDT)	ISO 16634-1:2008	ISO 12099:2017	ISO 14244:2014	ISO 5984:2022/ ДСТУ ISO 5984:2004	ISO 749:1977	ISO 5985:2002/ ДСТУ ISO 5985:2004	ISO 734:2023/ ДСТУ ISO 734-1:2008
Laboratory number	Moisture content, %	Moisture content, %	Crude protein content, % (Expressed as a mass fraction of the product as received)	Crude protein content, % (Expressed as a mass fraction of the product as received)	Crude protein content, % (Expressed as a mass fraction of the product as received, factor for converting nitrogen content to protein content - 6.25)	Crude protein content, % (Expressed as a mass fraction of the product as received, factor for converting nitrogen content to protein content - 6.25)	Soluble proteins in potassium hydroxide solution, g of soluble proteins per 100 g of the total protein	Crude ash, % (Expressed as a mass fraction of the product as received)	Total ash yielded by the sample as received, %	Ash insoluble in hydrochloric acid, % (Expressed as a mass fraction of the product as received)	Fat content, % (Expressed as a mass fraction of the product as received)
1	-0,10	-0,31	0,48		-0,11	0,06	0,76	-0,72	-0,39	0,23	0,63
2				-1,44				-0,57		1,41	
3	-0,43		-0,71	-0,32				1,89		1,70	
4	1,63										
5	-1,26			-0,67							-1,08
6	0,23										
7	-0,53			-0,40							-0,17
8	-0,06			1,70	1,27						0,00
9	0,15			0,70				-0,62	-0,12		0,58
10	-0,89	0,23		0,76	-0,33	0,14		-0,62		1,11	-0,46
11	2,28	0,44		-0,12	0,21						-0,67
12	0,19				-0,62	0,14					0,17
13											
14											
15											
16	0,08							2,57		-0,33	
17	0,01	-1,74		0,76		-1,73	-0,55	0,22		-0,94	-0,21
18											
19								0,37		-0,06	
20	0,08	-0,02									-0,25
21	-0,64			0,26			-0,87	-1,04		-1,53	0,42
22											
23											
24											
25											
26											
27	0,37	0,23	0,57	0,73		-0,06	0,80	0,06	0,51	-1,83	-0,17
28											
29								-0,20			
30	-0,10		-0,34					-0,10		0,53	0,67
31	1,35			-1,37			-0,76	1,26		-0,94	0,54
32	0,12			-0,52			0,62	0,11		0,53	-0,37

Method	ISO 12099:2017	ISO 6865:2000/ ДСТУ EN ISO 6865:2022 (EN ISO 6865:2000, IDT; ISO 6865:2000, IDT)	ISO 12099:2017	ДСТУ 7618:2014	ДСТУ 7621:2014, п.5.2-5.6	ДСТУ 7491:2013	ДСТУ 7169:2010	ДСТУ 7189:2010	ДСТУ 4924:2008	ДСТУ 7491:2013	ДСТУ 8076:2015
Laboratory number	Fat content, % (Expressed as a mass fraction of the product as received)	Crude fibre content, % (Expressed as a mass fraction of the product as received)	Crude fibre content, % (Expressed as a mass fraction of the product as received)	Acid value of oil, mg KOH/g	Moisture content, %	Moisture content, %	Crude protein content, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Protein content, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Mass fraction of crude protein, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Mass fraction of crude protein, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)	Mass fraction of soluble proteins in potassium hydroxide, %
1	0,61	-0,97	-0,79	-0,03	-0,25		1,06	0,74			0,26
2					-0,25						-0,76
3		0,49									
4							-2,08				
5											
6								0,02			
7											
8											
9		1,98			0,15						
10	-0,28	0,07	-0,23	2,91	-0,18	-0,78	0,62	-0,20	0,43	0,40	
11	0,06	0,47									
12	0,20				-0,54			-0,04		0,56	
13					1,63		1,66				
14					-0,54		0,38				
15				1,98	0,62	0,56	-0,16			2,17	
16							0,03				
17	-0,42	0,58	0,49			-0,42	0,84			-1,49	
18					-0,18		-0,09	-0,20			
19					-1,26		0,38	0,43			
20	0,61	-0,99			1,34						
21		-0,19			-0,14	-0,02	0,22				1,14
22					-0,03		-0,06				
23					0,22						
24					0,29						
25					0,08		-1,01				
26					0,22						
27	-0,96	-0,50	0,53	0,11	0,47		0,27		0,38		1,30
28					-1,26	0,67	-0,96			-1,65	
29				-4,40	0,18		-1,51				
30				-1,42	-0,07		0,07		0,03		
31		0,59		-0,58							-1,28
32		-0,59					-0,53	-1,50	-0,84		-0,65

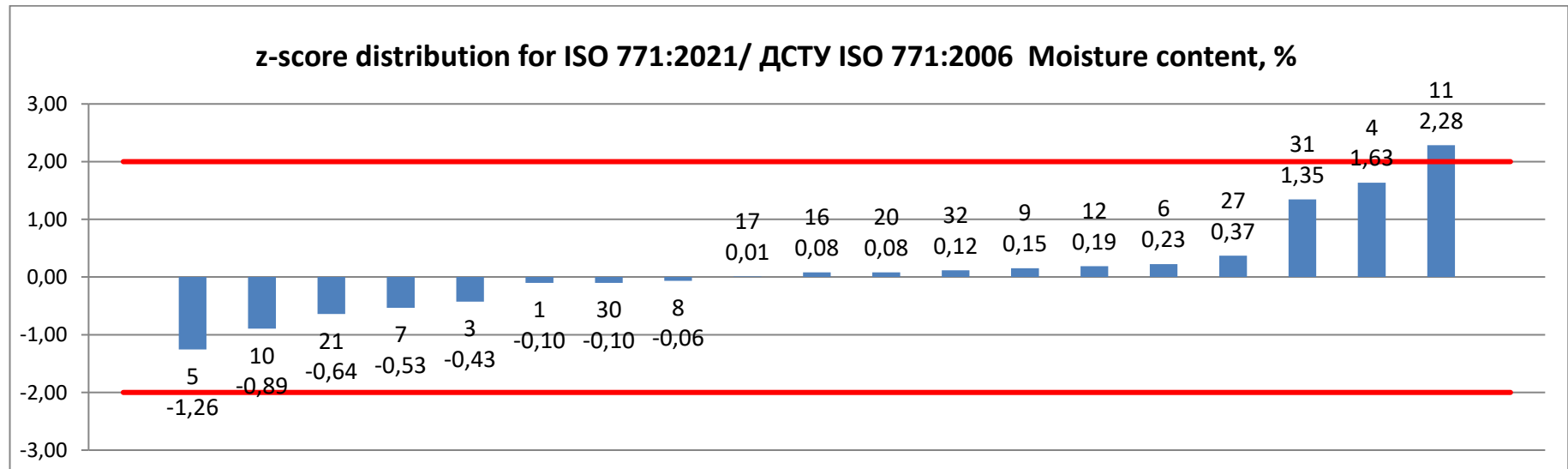
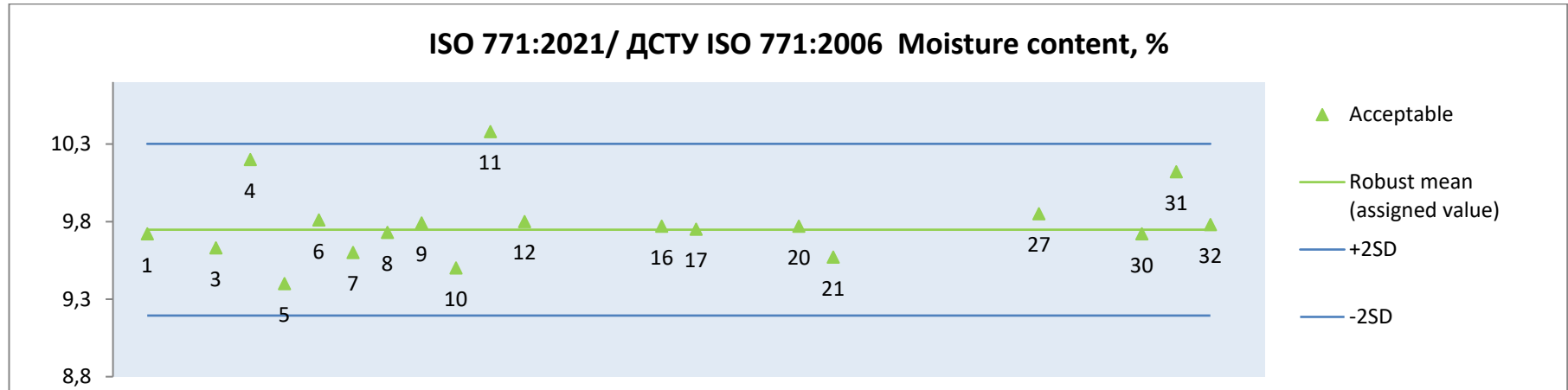
Method	ГОСТ 26226-95	ДСТУ 9174:2022	ДСТУ 9174:2022	ГОСТ 13496.15-97	ДСТУ 7491:2013	ДСТУ 7458:2013	ДСТУ 8844:2019 п. 6.1.	ДСТУ 7491:2013	ДСТУ 8659:2016	ISO 6495-1:2015/ДСТУ ISO 6495:2005	ISO 8892:1987	ISO 9289:1991/ДСТУ ISO 9289:2008
Laboratory number	Mass fraction of crude ash, % (Expressed on absolute dry matter)	Mass fraction of crude ash, % (Expressed on absolute dry matter)	Mass fraction of ash insoluble in hydrochloric acid, % (Expressed on absolute dry matter)	Mass fraction of crude fat, % (Expressed on absolute dry matter)	Mass fraction of crude fat, % (Expressed on absolute dry matter)	Mass fraction of crude fat, % (Expressed on absolute dry matter)	Mass fraction of crude fibre, % (Expressed on absolute dry matter)	Mass fraction of crude fibre, % (Expressed on absolute dry matter)	Peroxide value of oil, %O mmol/kg	Water-soluble chloride content, expressed as sodium chloride, % (Expressed as a mass fraction of the product as received)	Total residual hexane content, mg/kg	Free residual hexane content, mg/kg
1		0,18	0,68			1,19	-0,56		0,42	-0,34	0,99	1,16
2				-0,50			1,99					
3												
4	-0,03			-0,57								
5												
6				-0,50			-0,38					
7												
8												
9	-0,08	0,03		1,39		1,13						
10	0,01	0,13	1,49	-0,50	0,08	-0,37	-0,32	-0,85			-0,99	-0,58
11												
12					0,54	0,13	0,87					
13						1,07						
14						2,51	3,25		-3,74			
15					-0,17	-0,09			-0,79			
16						0,57	-0,97					1,76
17					0,03		0,92	-0,18	0,39		16,04	-0,74
18						-1,25	-0,32					
19						0,00	-0,72				-1,40	0,73
20		-0,31	-0,08			-0,19	-0,51					-0,39
21		-0,22	-0,53			1,01	-1,41		-0,61			0,17
22	0,06					-1,38						
23	0,31					-1,25						
24	-0,47											
25	-0,18					-1,38						
26	-0,08					-1,25						
27		0,67	-1,42			-0,19	0,01			-0,78		0,36
28		-0,17	-0,14	-1,38	-0,48		0,83	1,03				
29						-0,50	-0,03		0,76			
30				1,10		1,26	-0,85		0,67			
31				1,32			0,83		1,41	1,13		-1,49
32	0,84			-0,36								

Remarks

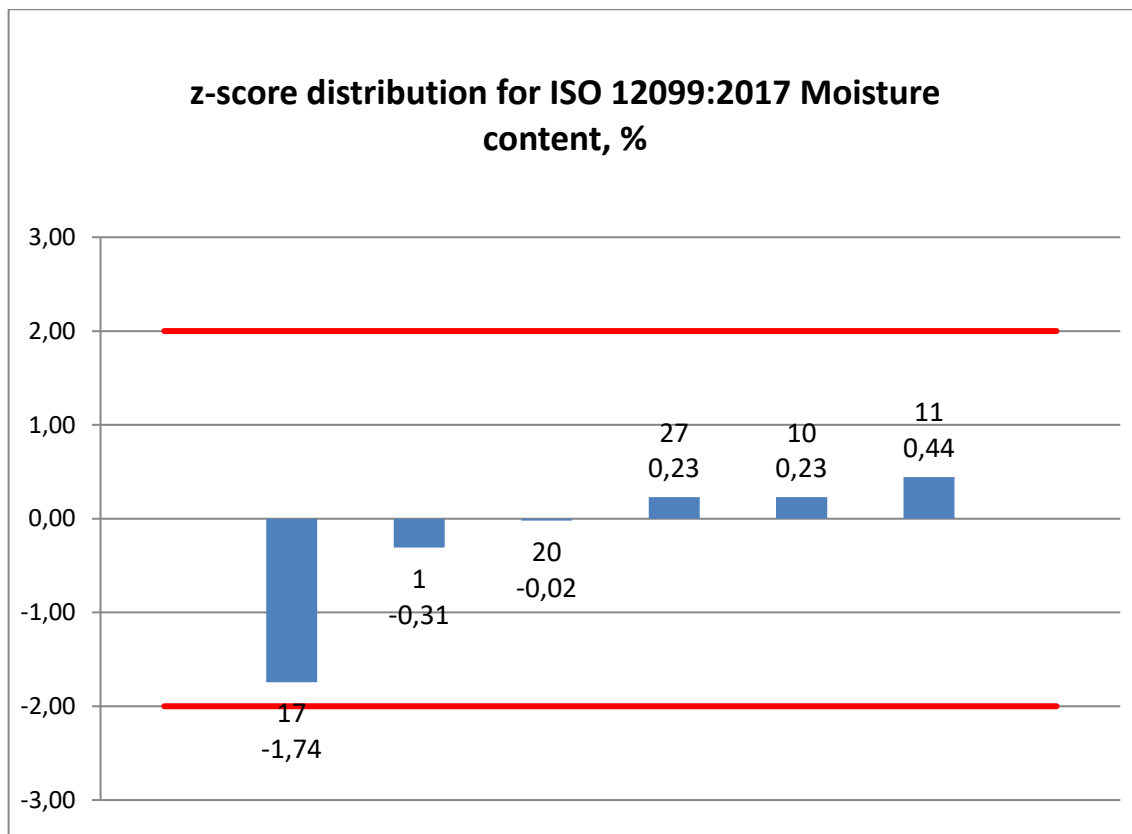
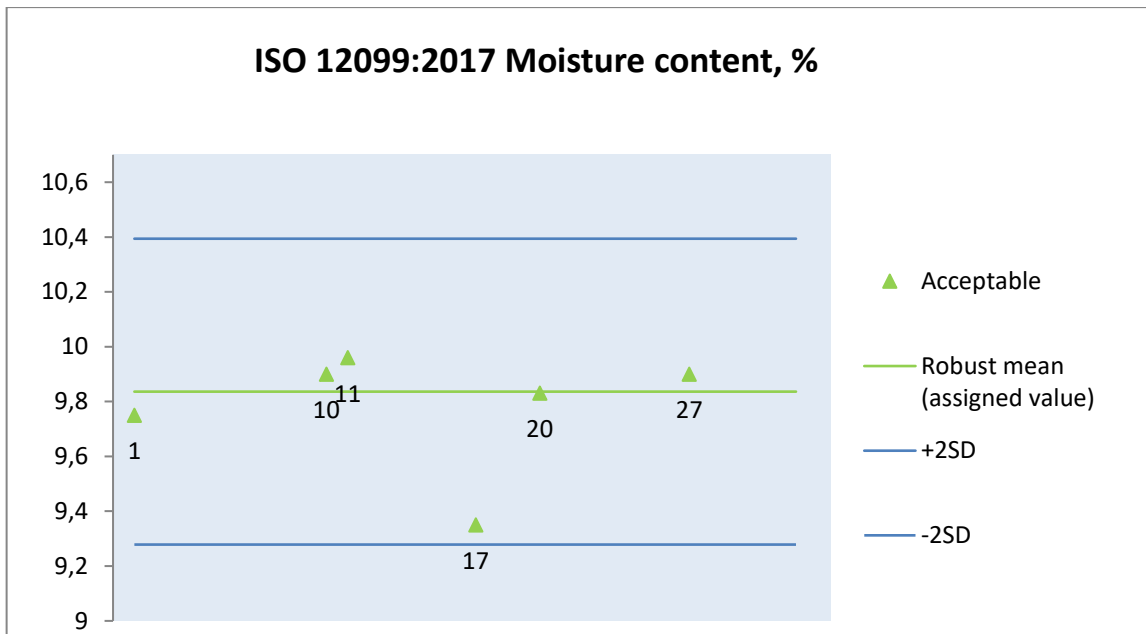
1. Green colored cells contain results that are considered to be satisfactory.
2. Red colored cells contain results that are considered to be not satisfactory.
3. Results that are considered to be questionable are marked by yellow colored cell.
4. Blank cell – results were not reported by the Participant.

8. Z SCORE PLOTS AND RESULTS CHARTS.

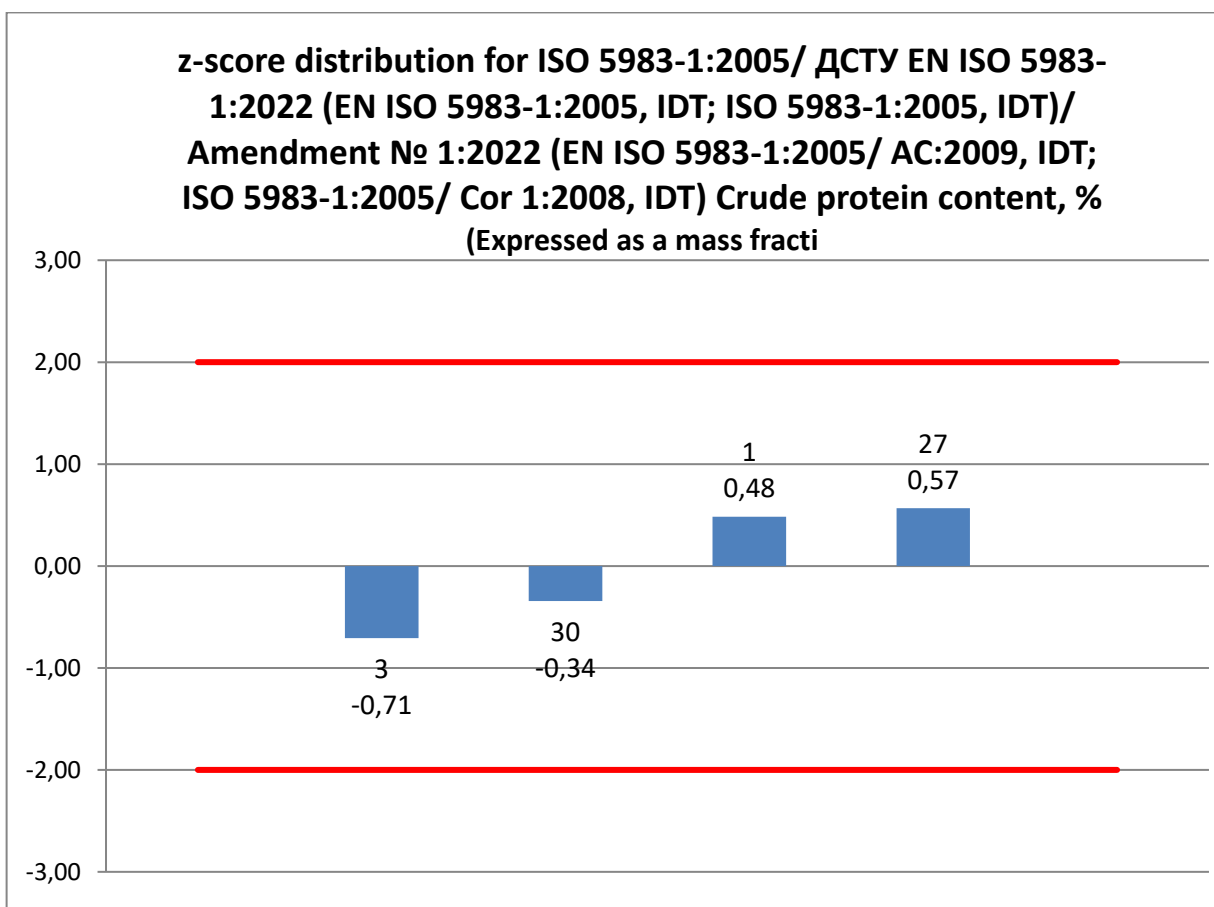
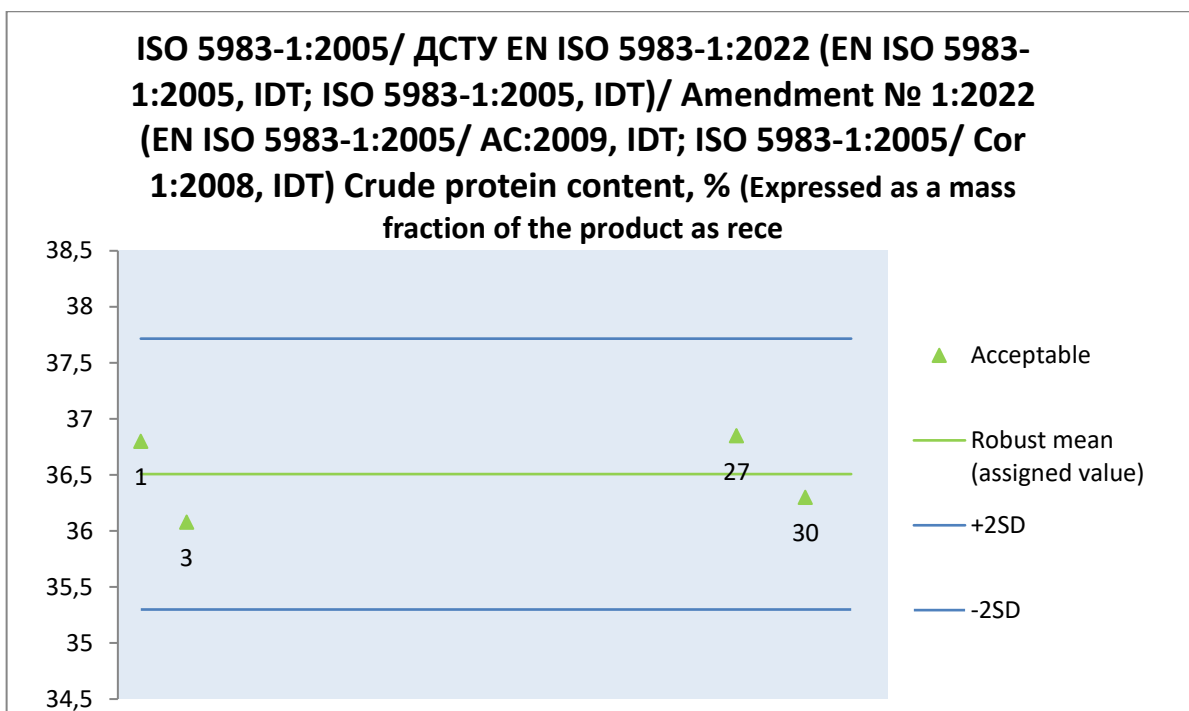
8.1. ISO 771:2021/ ДСТУ ISO 771:2006 Moisture content, %



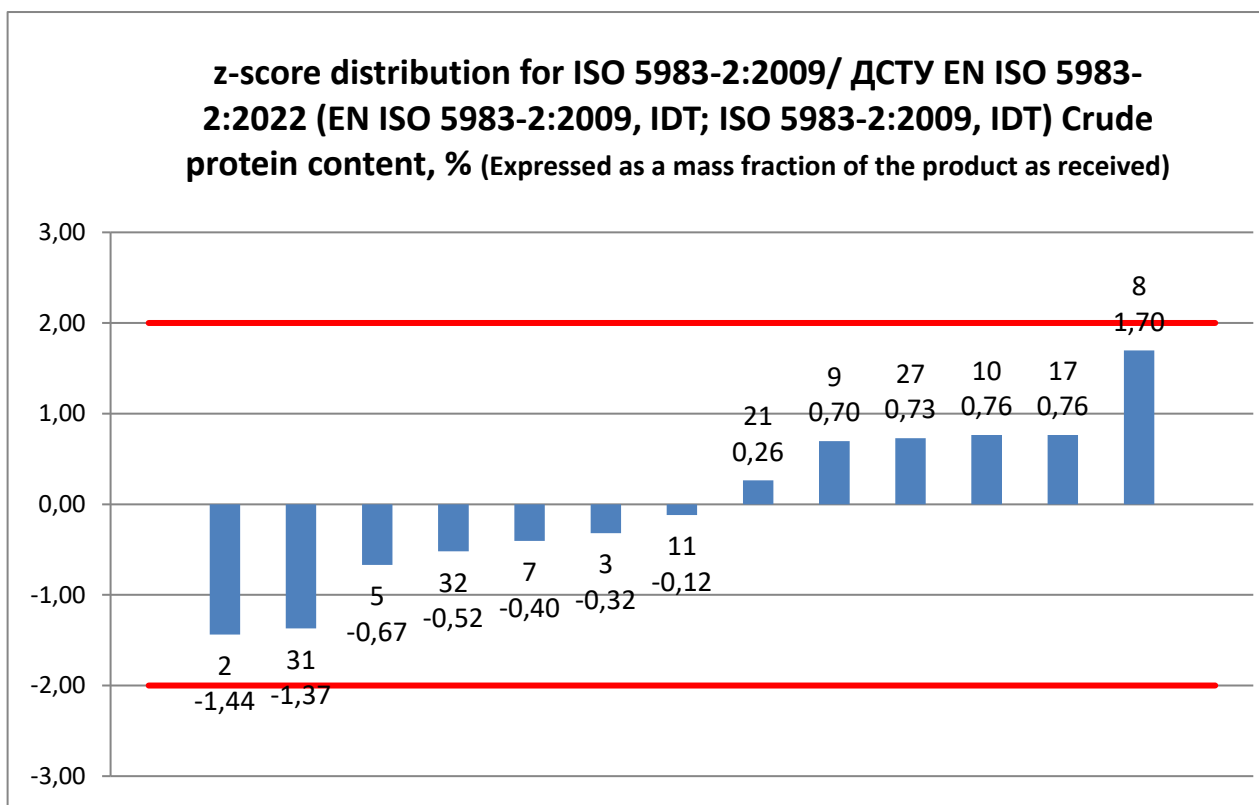
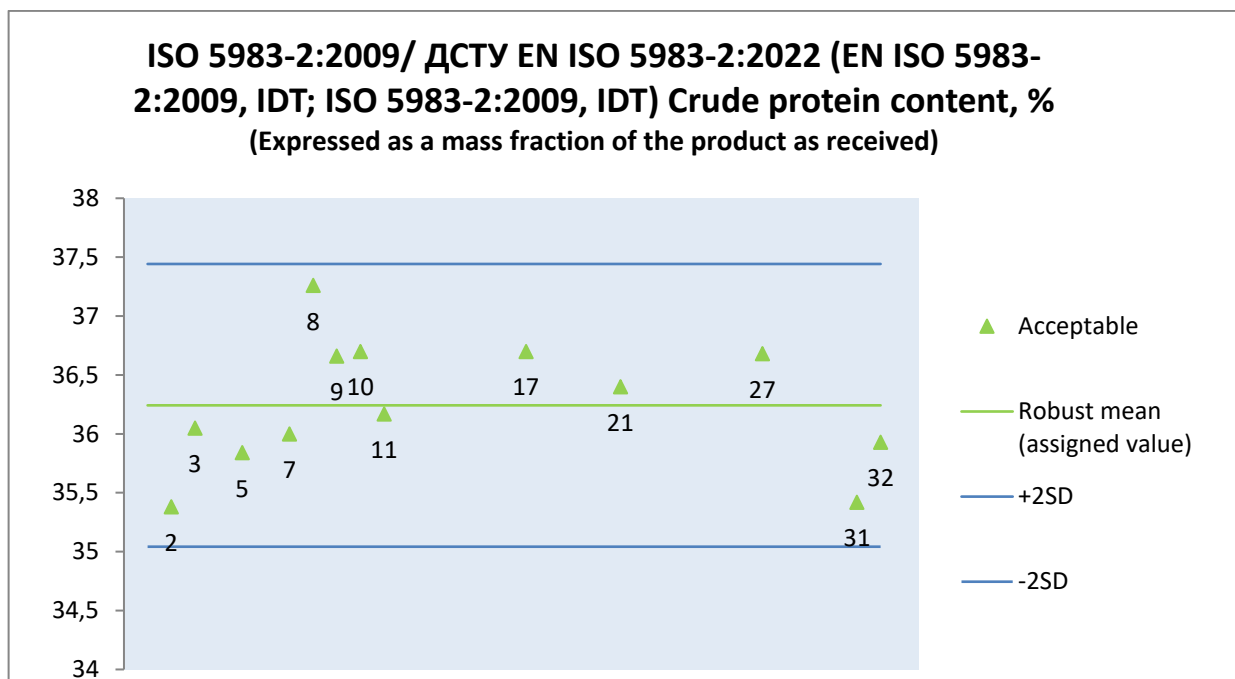
8.2. ISO 12099:2017 Moisture content, %



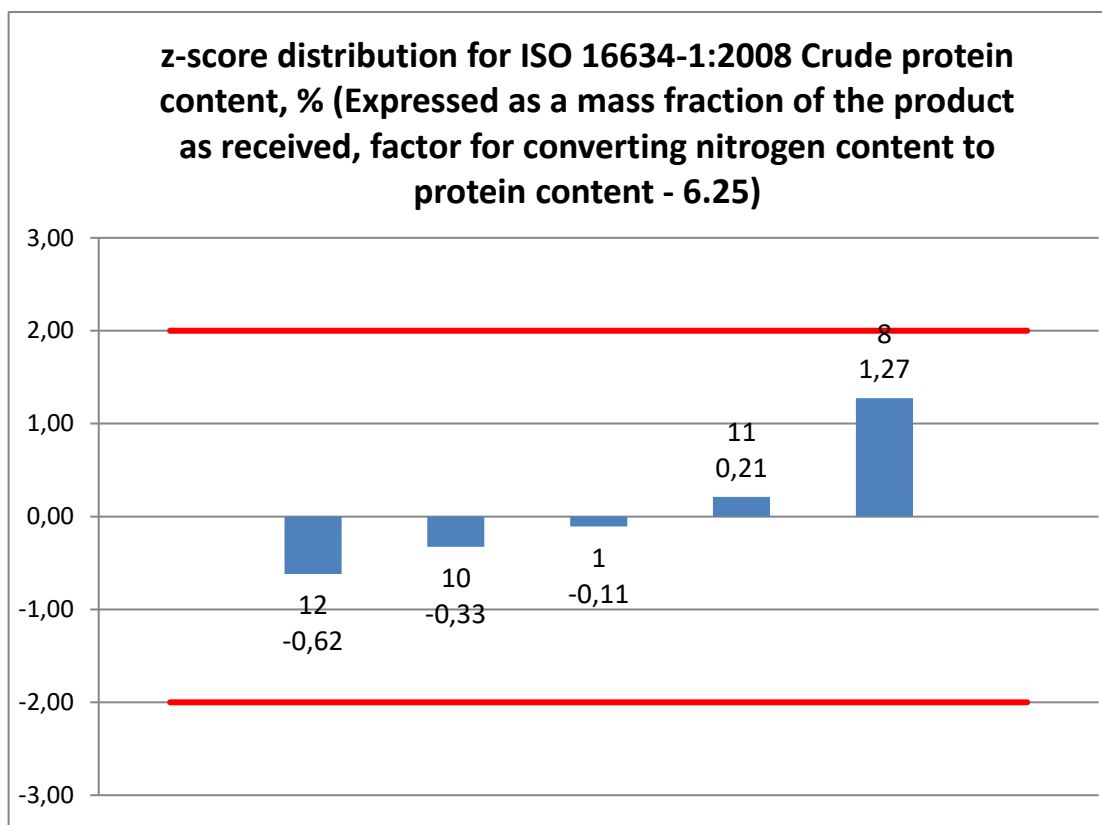
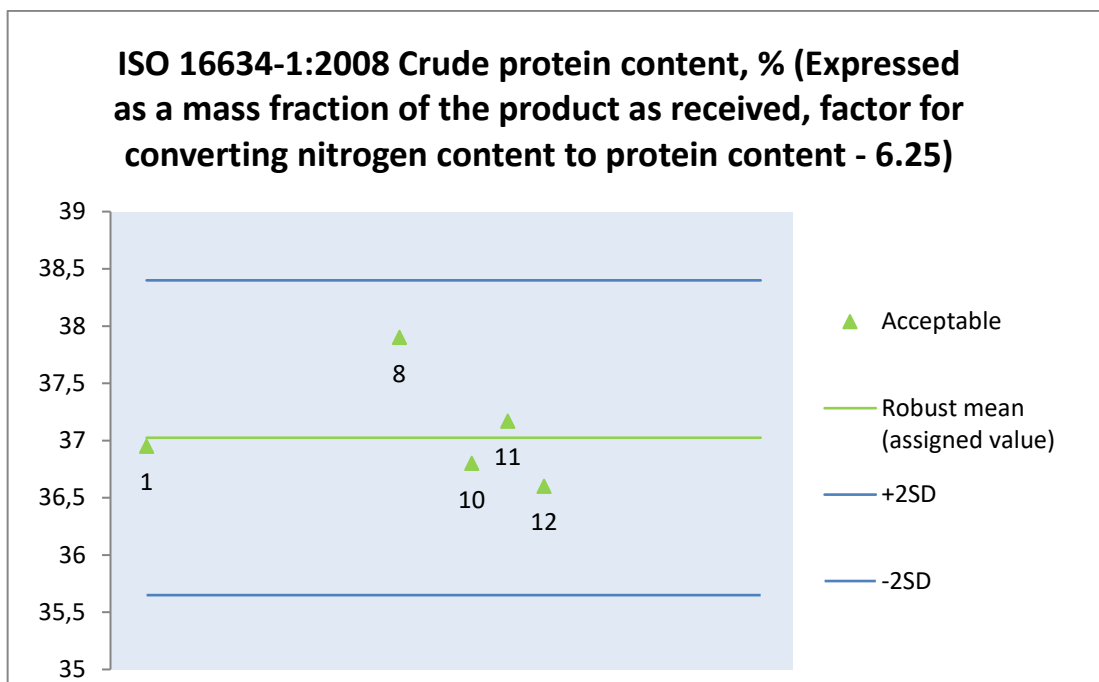
8.3. ISO 5983-1:2005/ ДСТУ EN ISO 5983-1:2022 (EN ISO 5983-1:2005, IDT; ISO 5983-1:2005, IDT)/ Amendment № 1:2022 (EN ISO 5983-1:2005/ AC:2009, IDT; ISO 5983-1:2005/ Cor 1:2008, IDT) Crude protein content, % (Expressed as a mass fraction of the product as received)



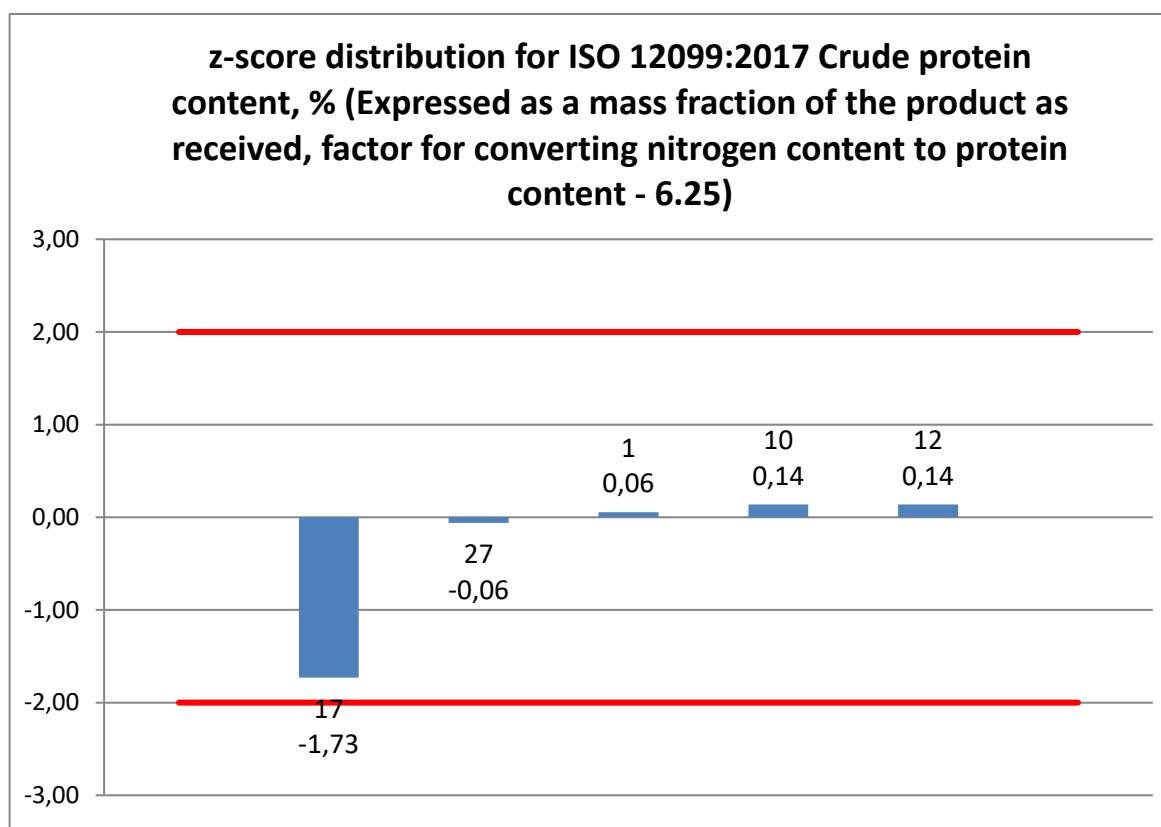
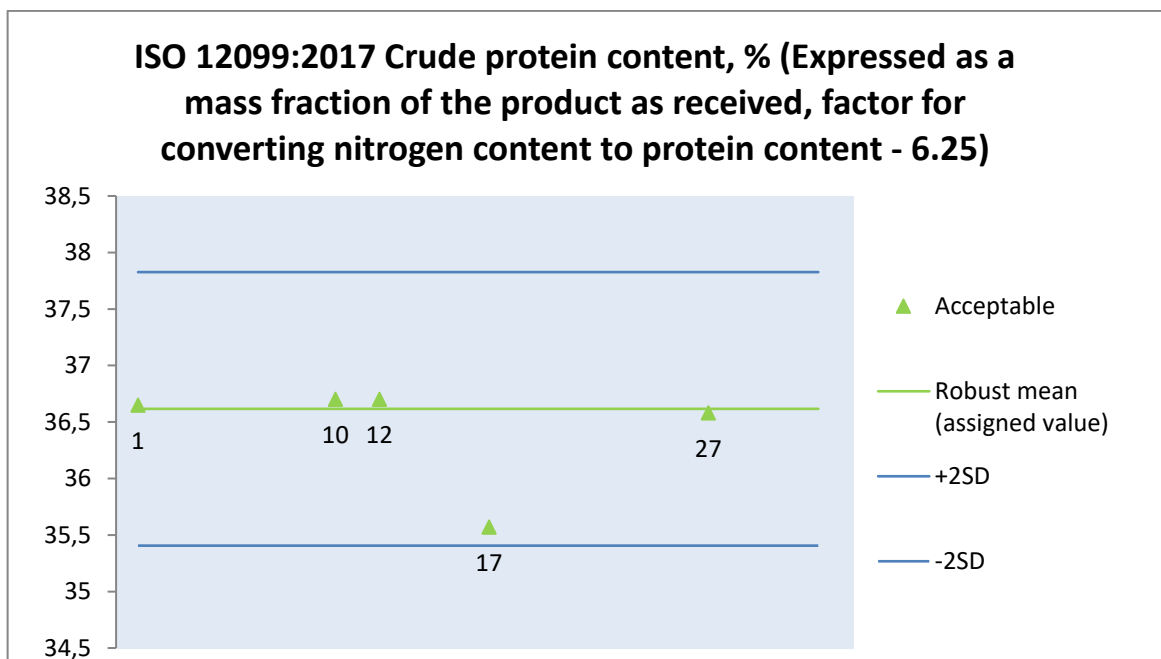
8.4. ISO 5983-2:2009/ ДСТУ EN ISO 5983-2:2022 (EN ISO 5983-2:2009, IDT; ISO 5983-2:2009, IDT) Crude protein content, % (Expressed as a mass fraction of the product as received)



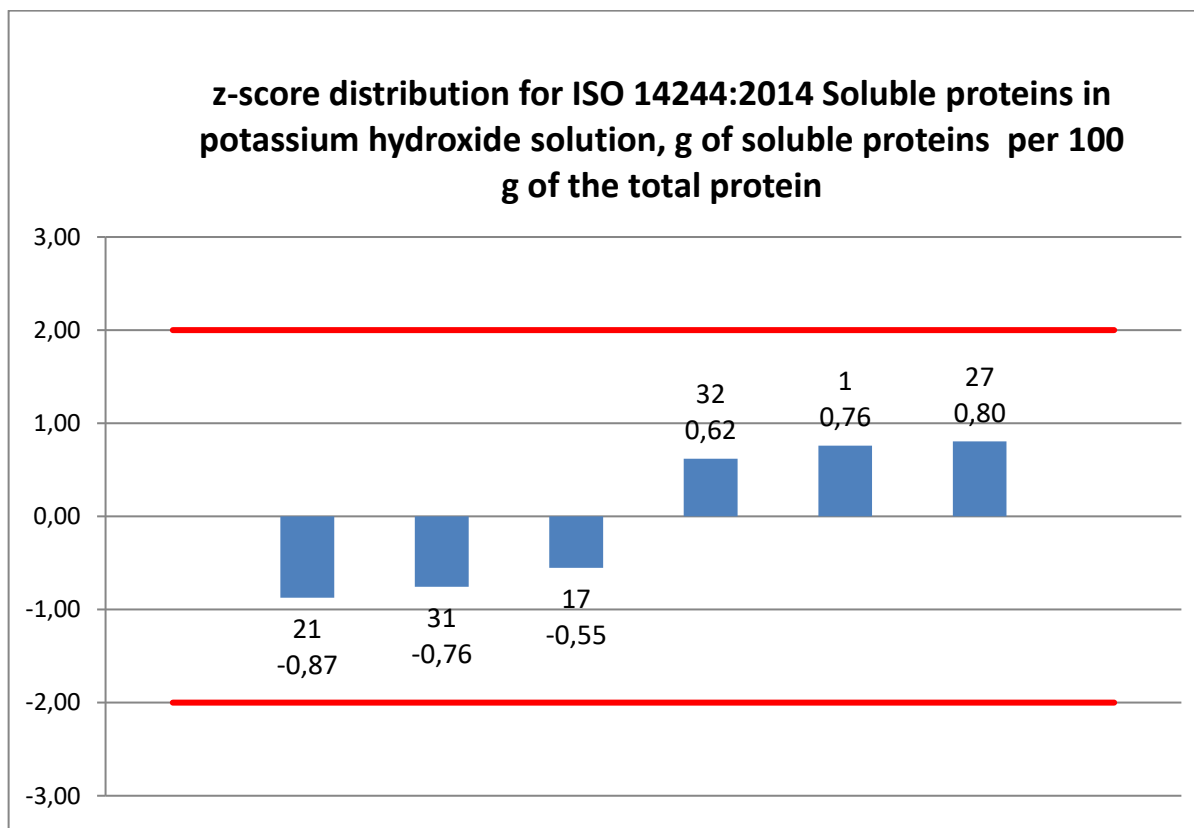
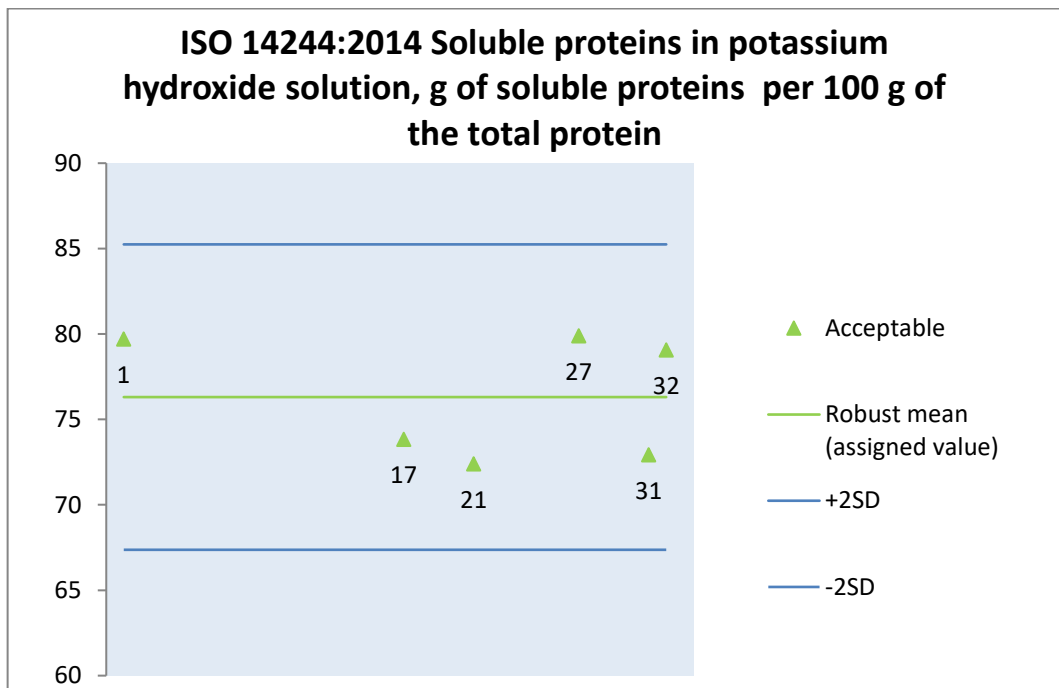
8.5. ISO 16634-1:2008 Crude protein content, % (Expressed as a mass fraction of the product as received, factor for converting nitrogen content to protein content - 6.25)



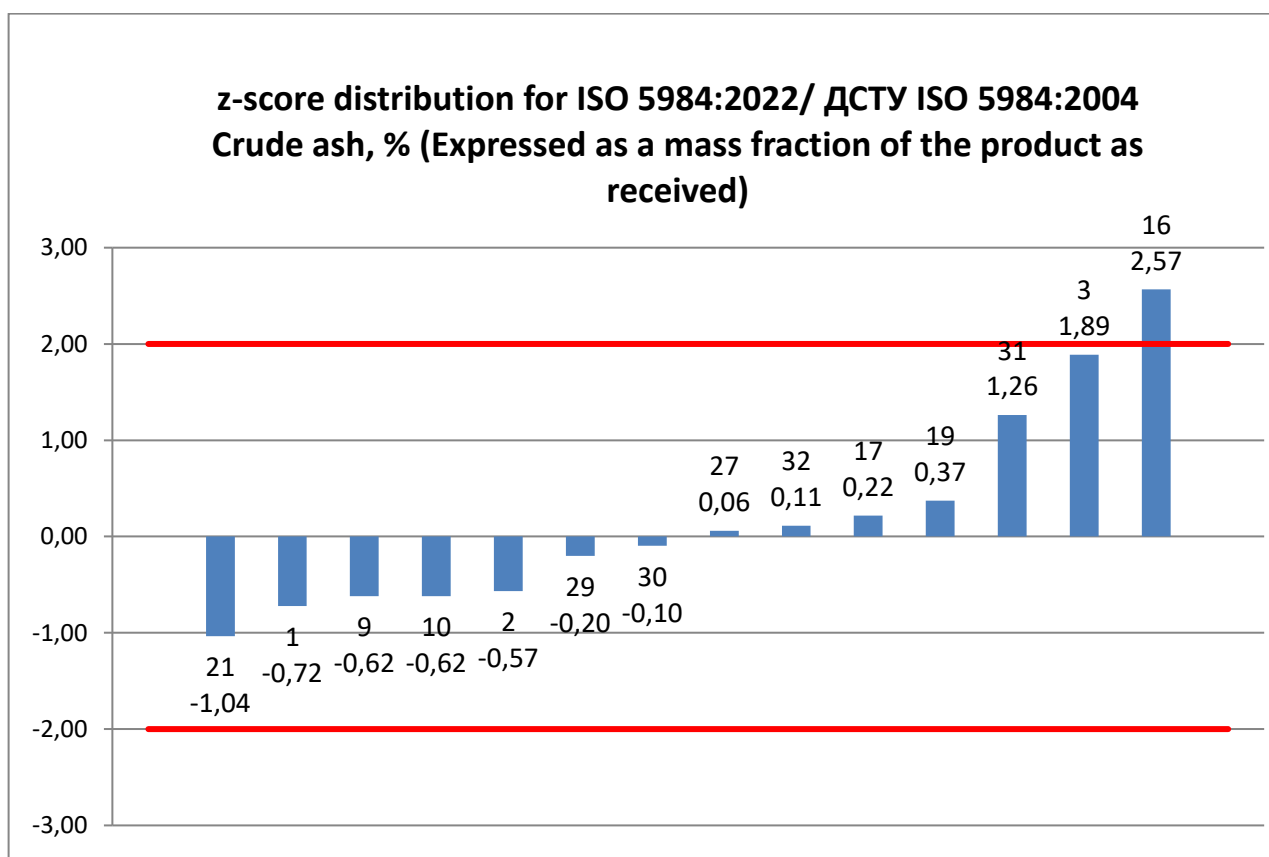
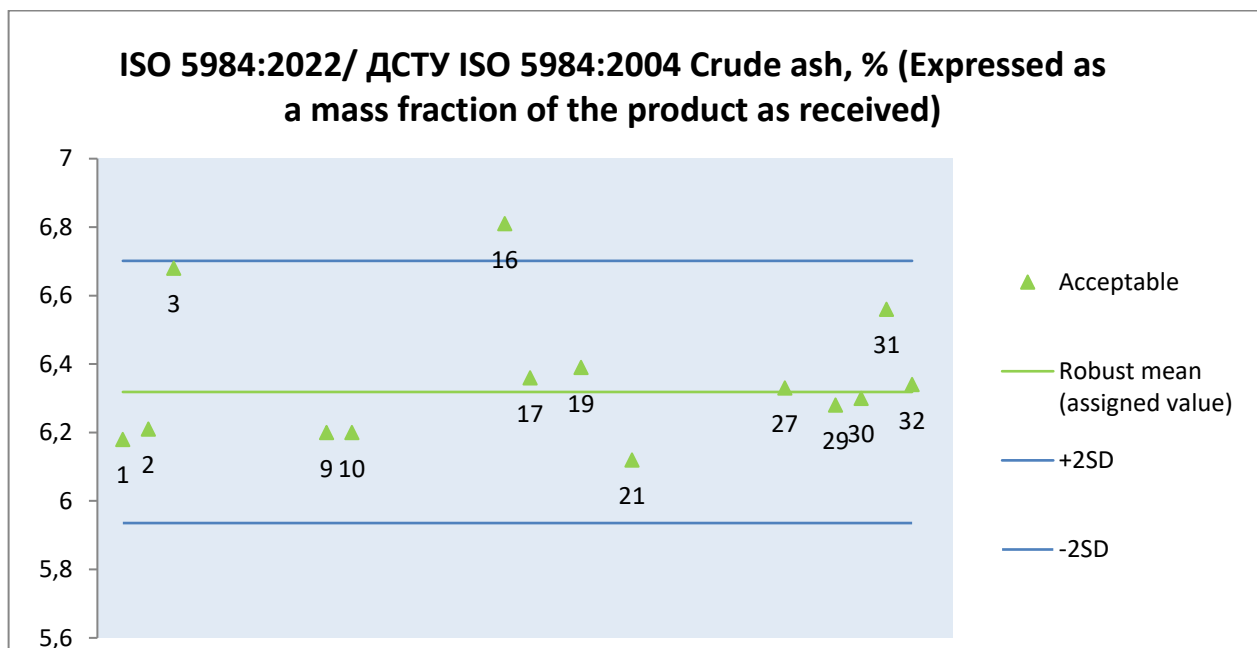
8.6. ISO 12099:2017 Crude protein content, % (Expressed as a mass fraction of the product as received, factor for converting nitrogen content to protein content - 6.25)



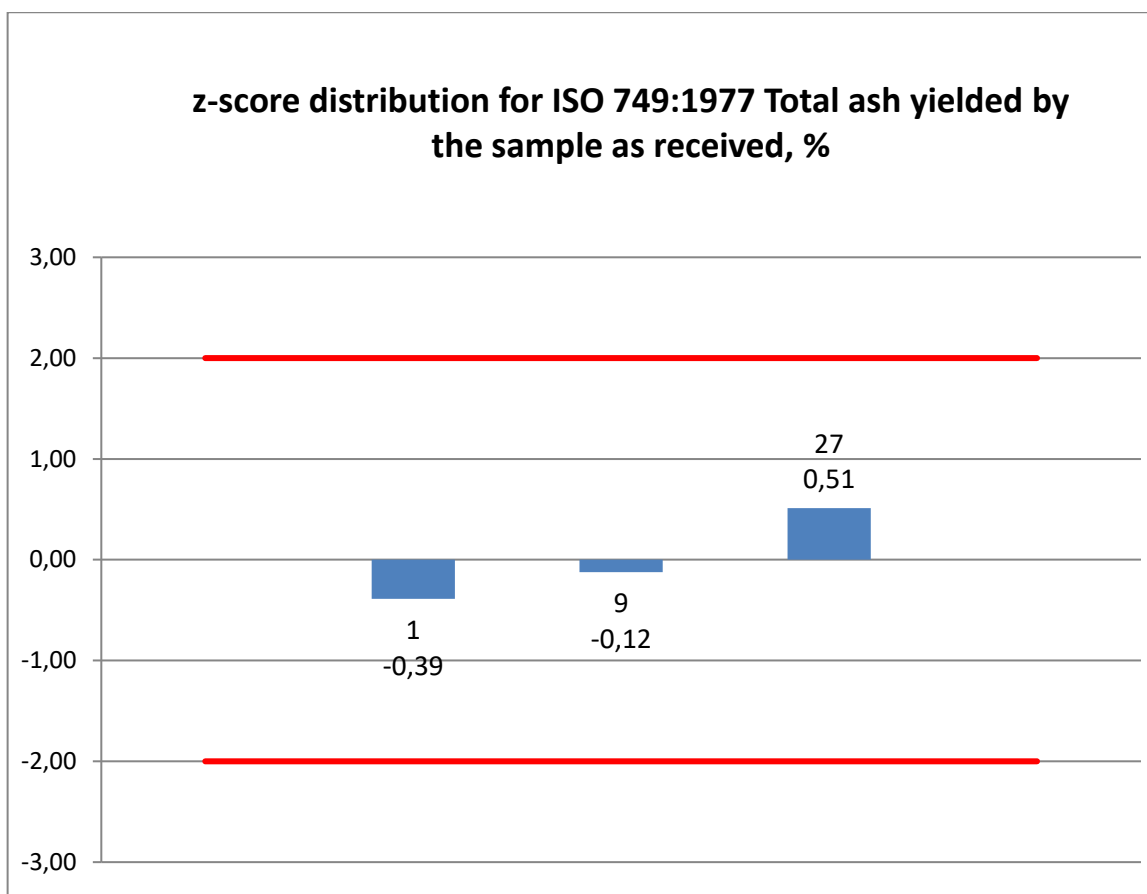
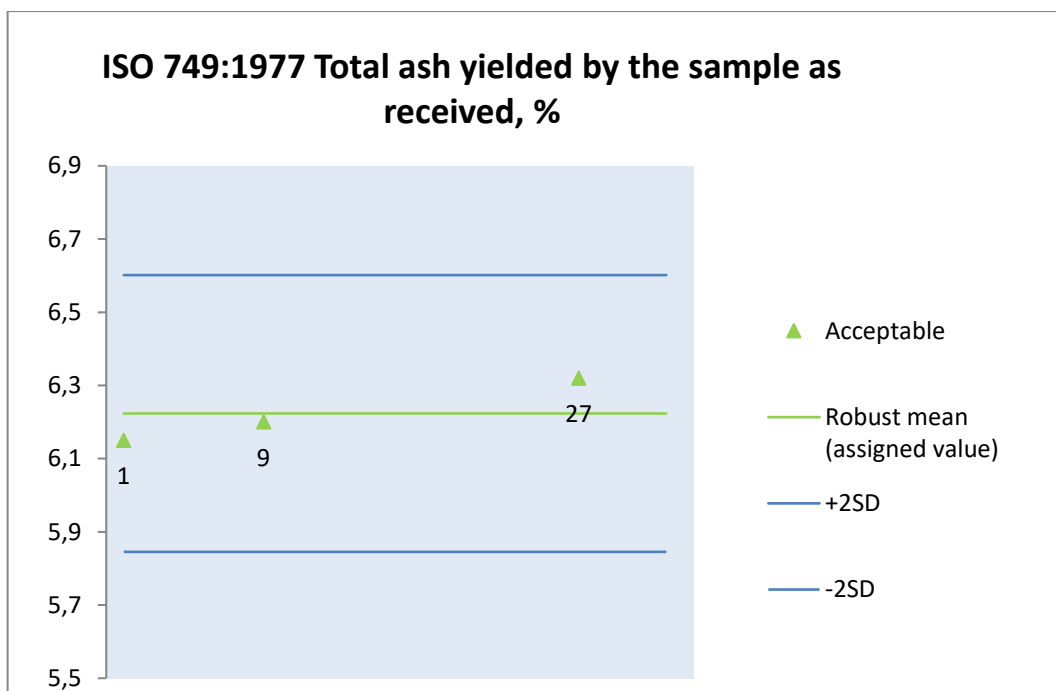
8.7. ISO 14244:2014 Soluble proteins in potassium hydroxide solution, g of soluble proteins per 100 g of the total protein



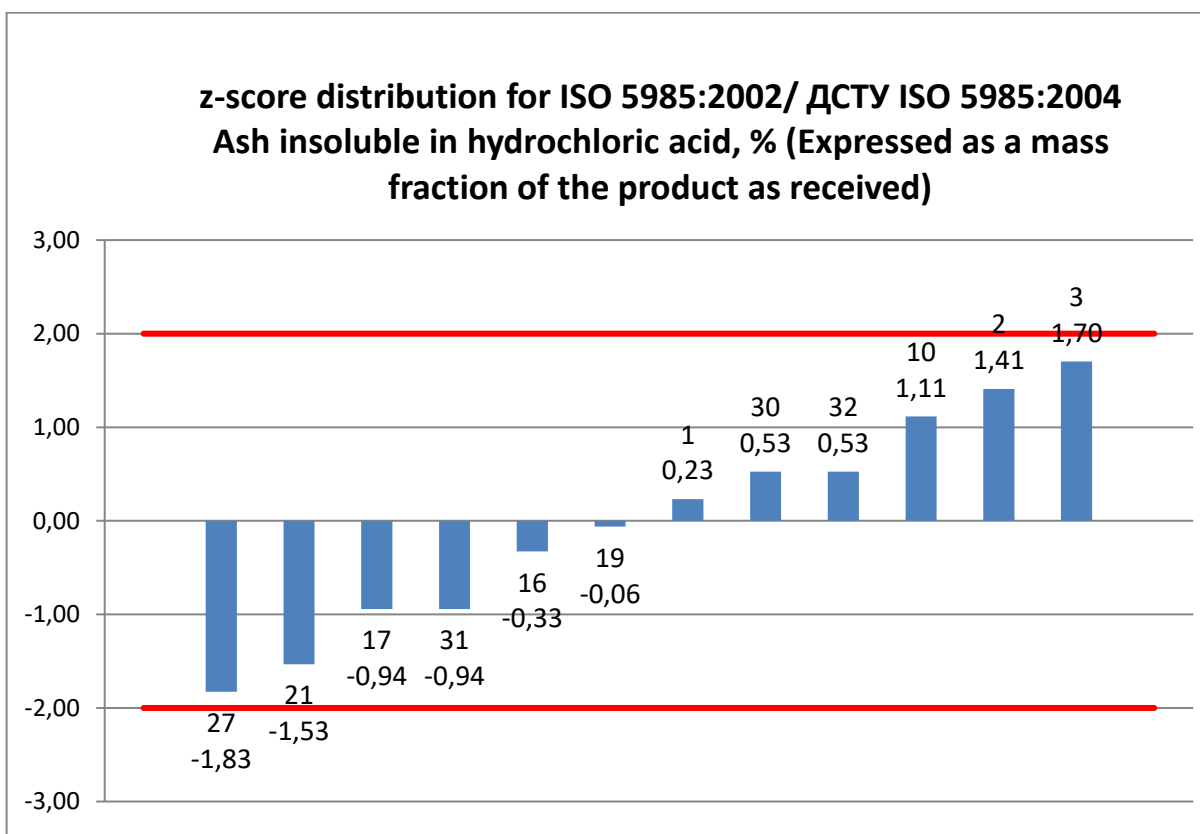
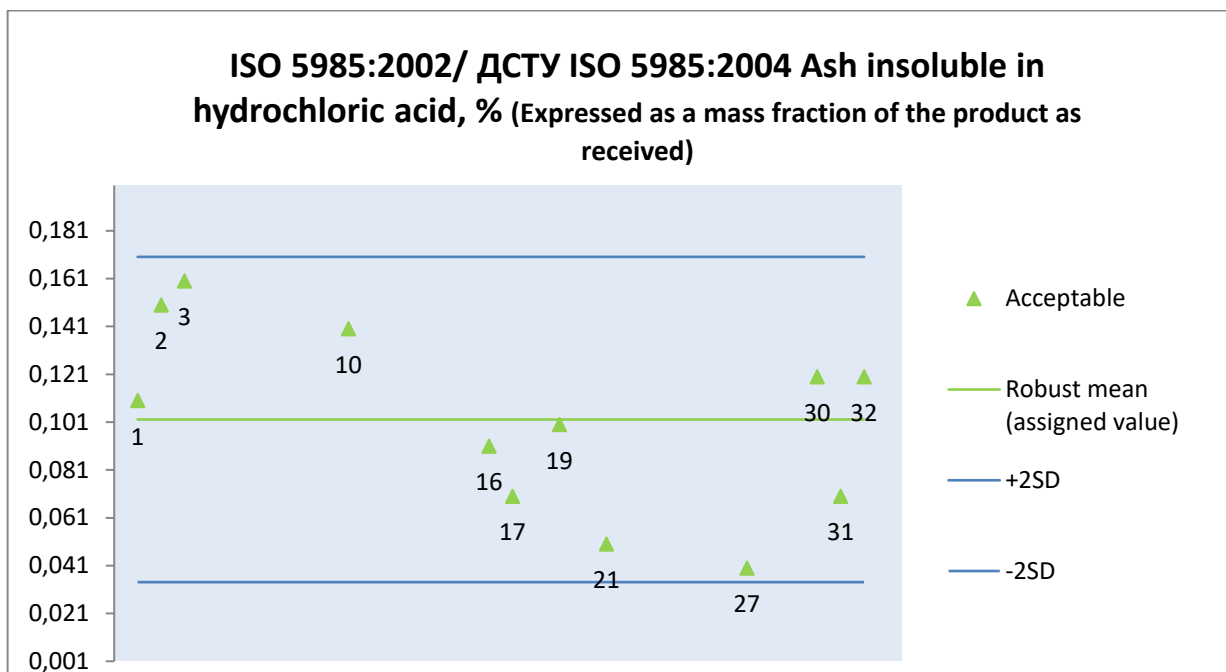
8.8. ISO 5984:2022/ ДСТУ ISO 5984:2004 Crude ash, % (Expressed as a mass fraction of the product as received)



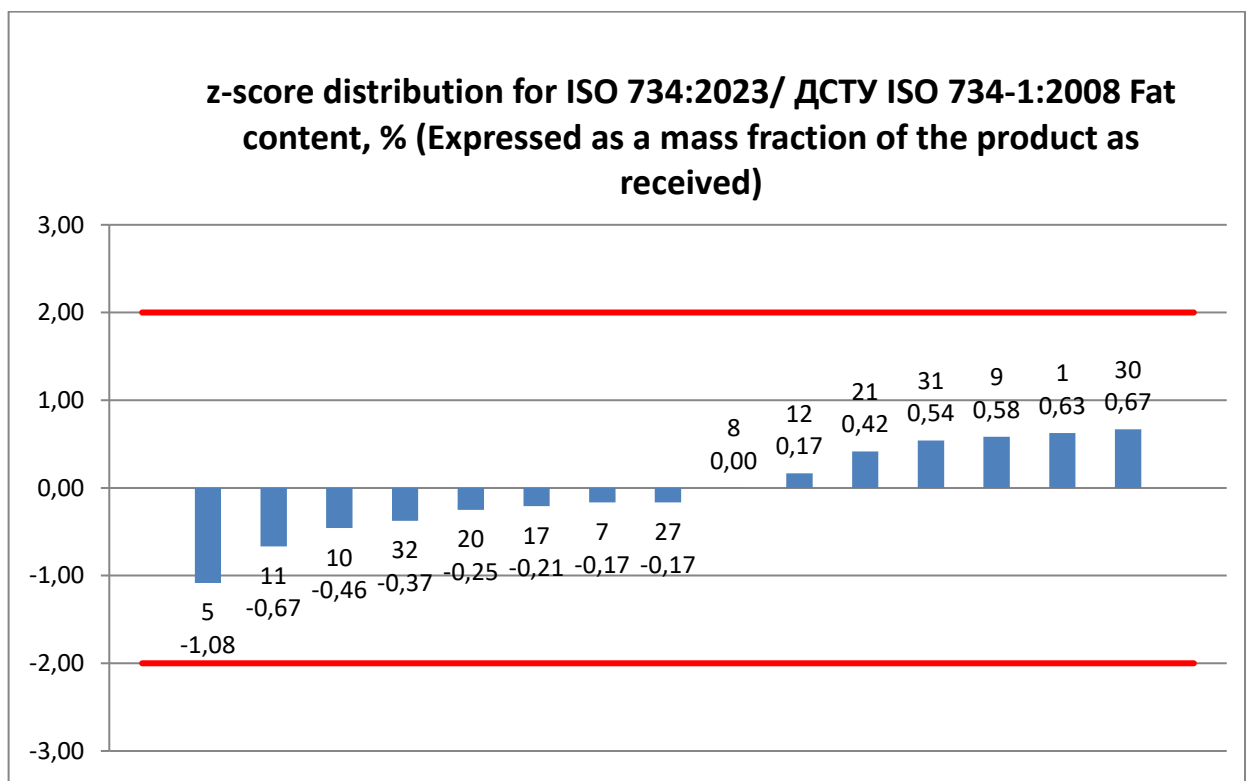
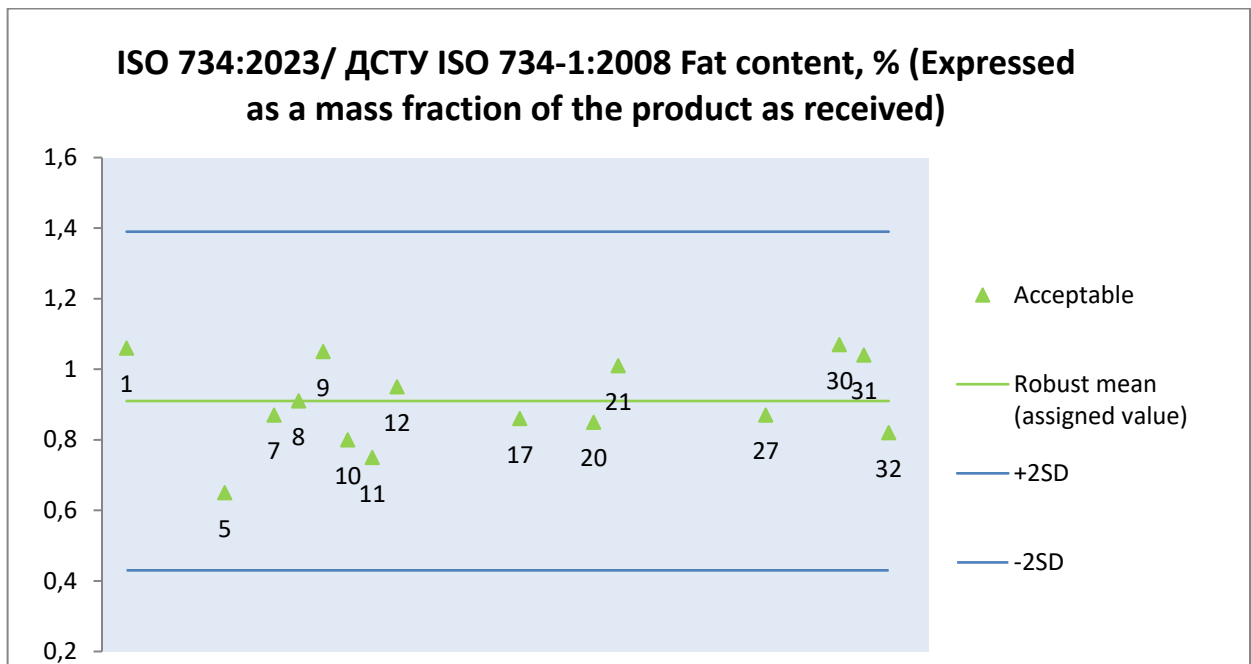
8.9. ISO 749:1977 Total ash yielded by the sample as received, %



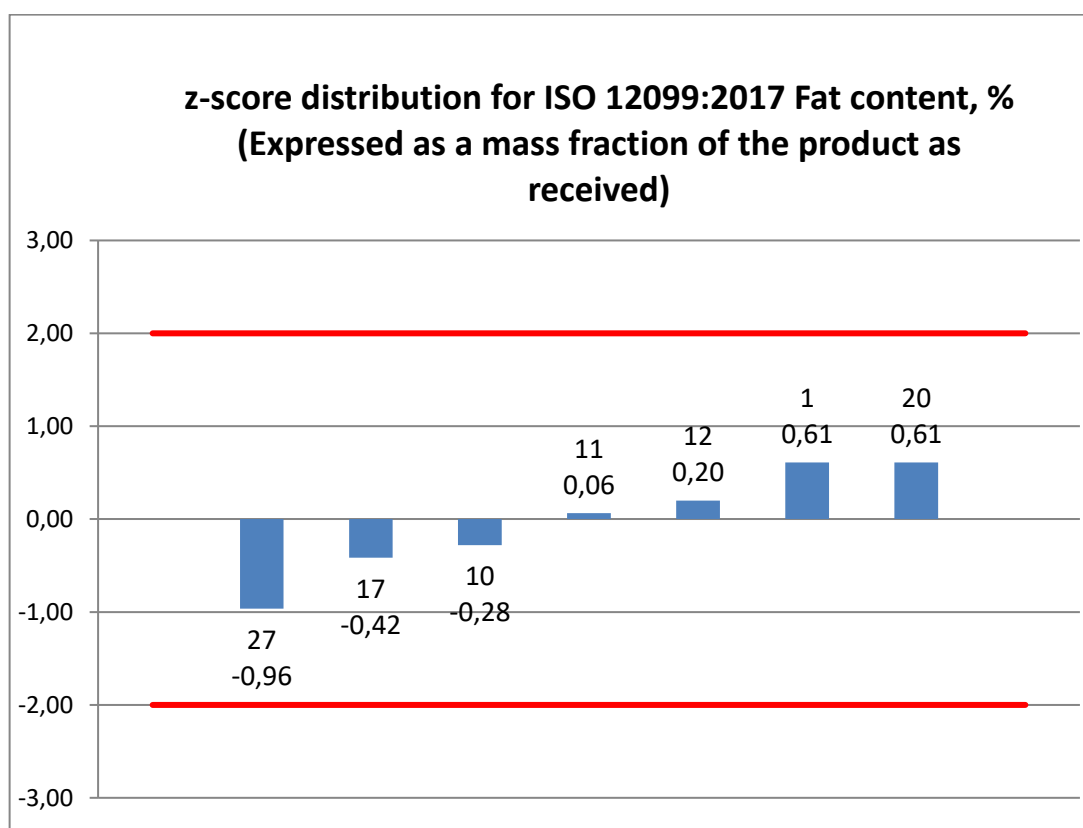
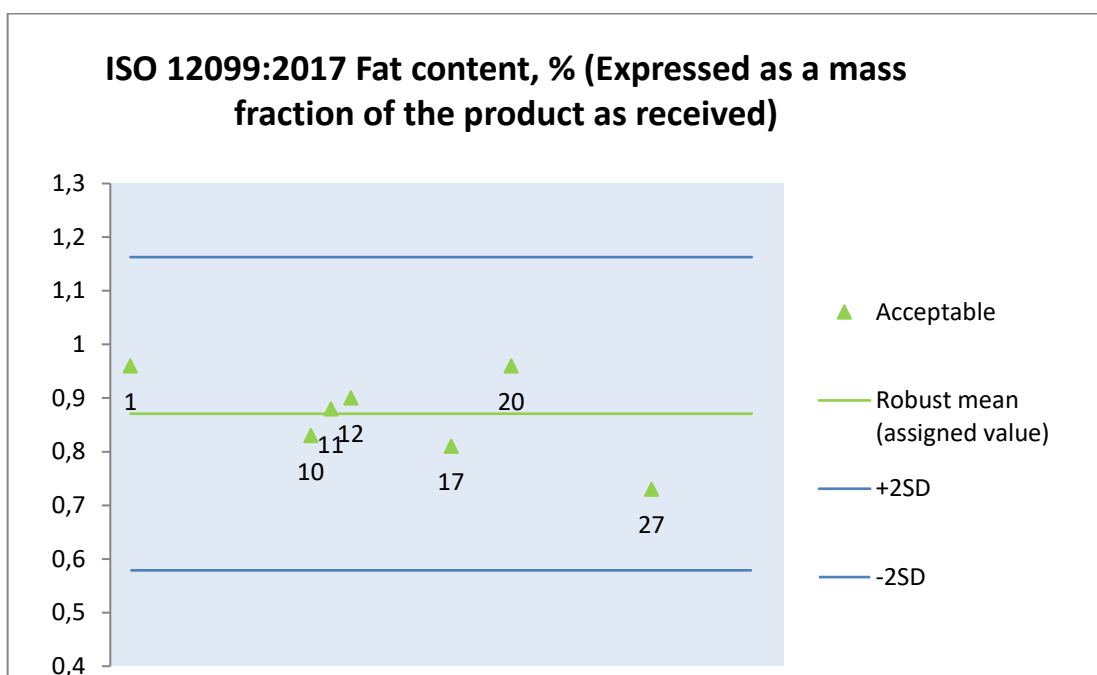
8.10. ISO 5985:2002/Amd 1:2015/ ДСТУ ISO 5985:2004 Ash insoluble in hydrochloric acid, % (Expressed as a mass fraction of the product as received)



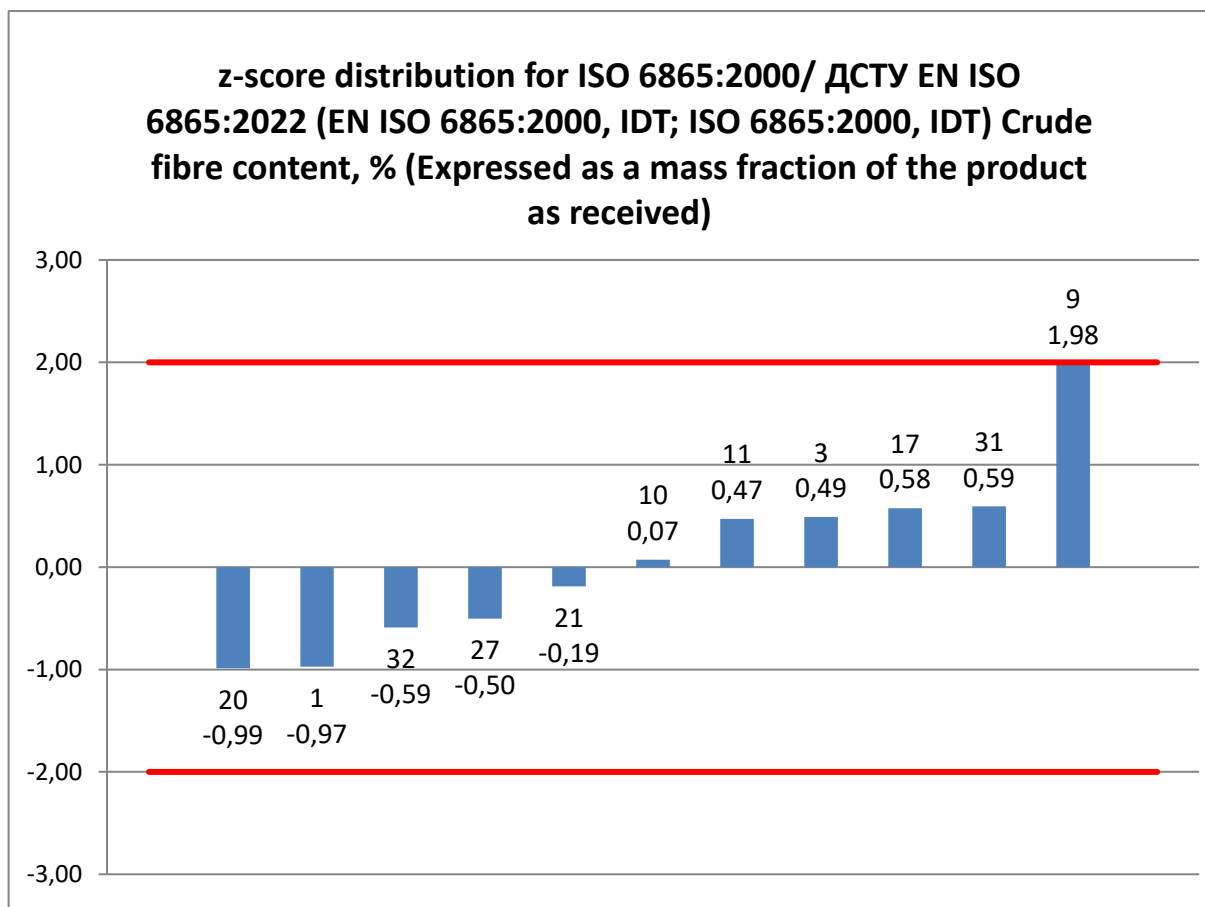
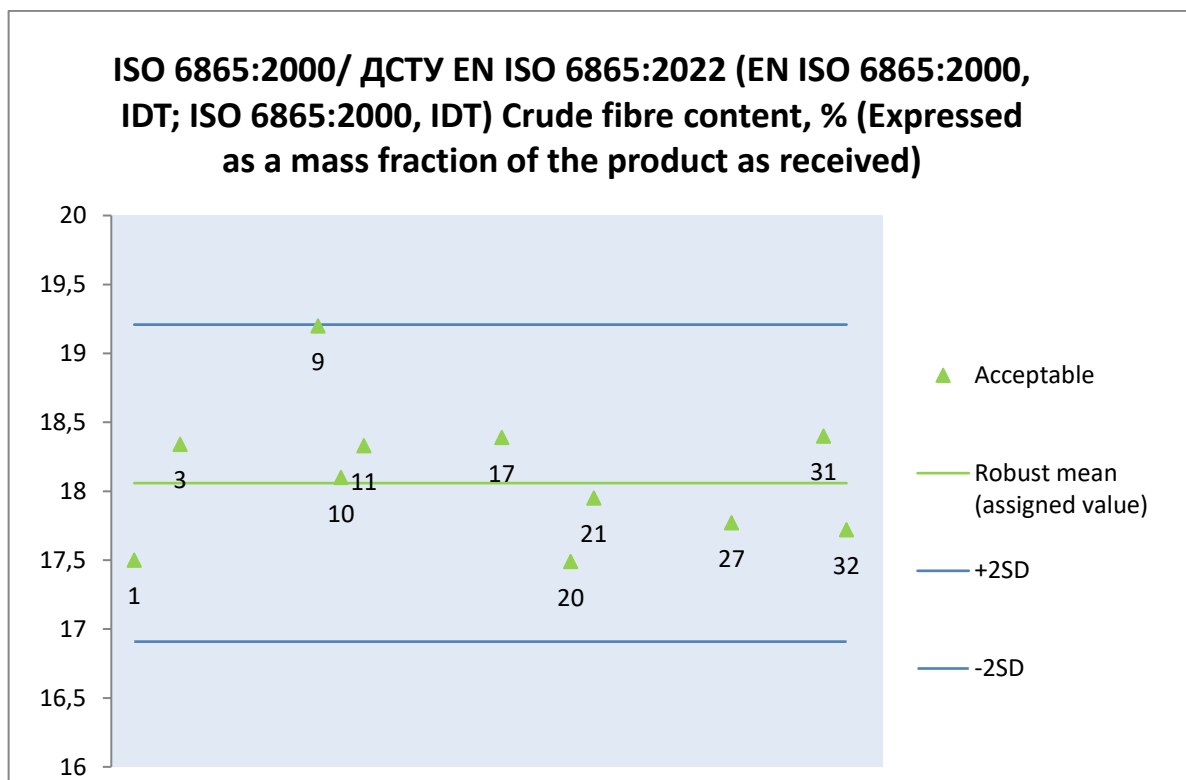
8.11. ISO 734:2023/ ДСТУ ISO 734-1:2008 Fat content, % (Expressed as a mass fraction of the product as received)



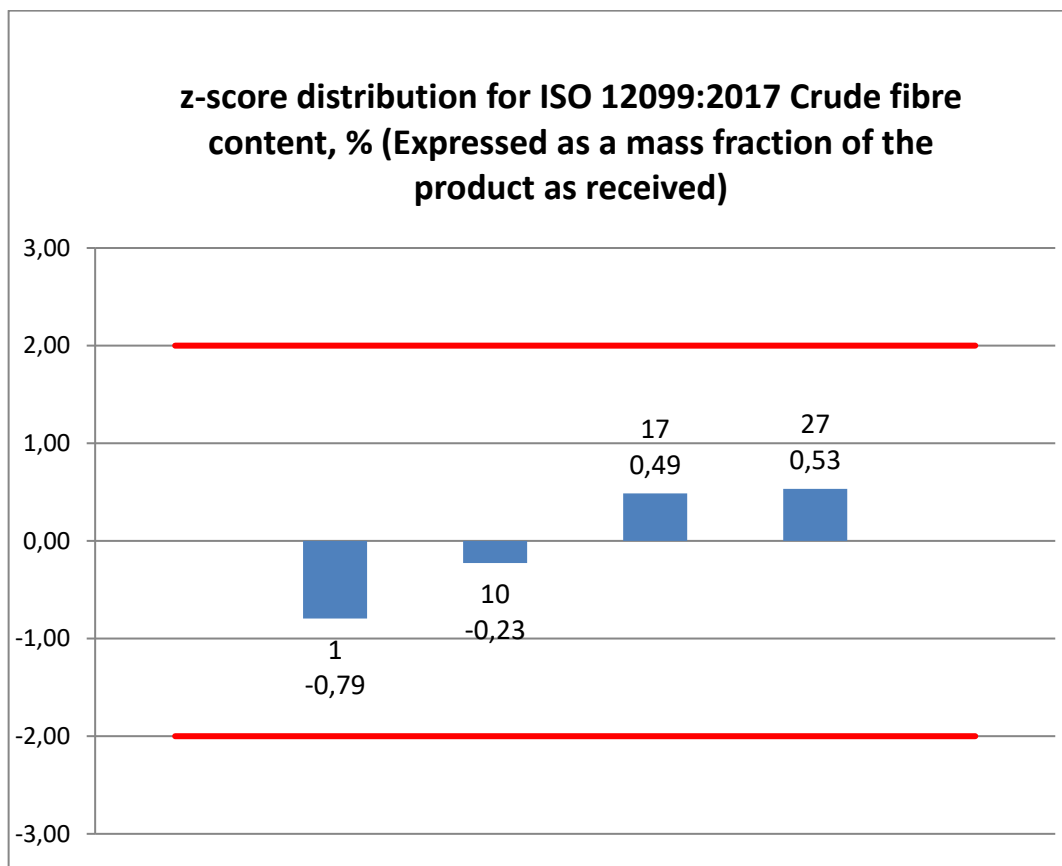
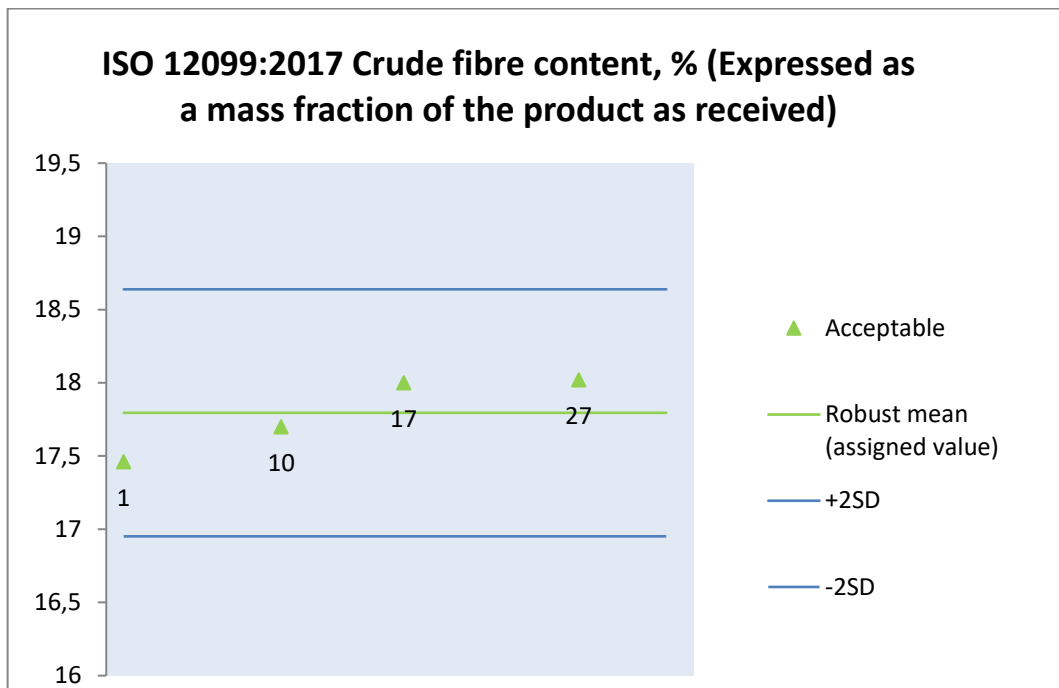
8.12. ISO 12099:2017 Fat content, % (Expressed as a mass fraction of the product as received)



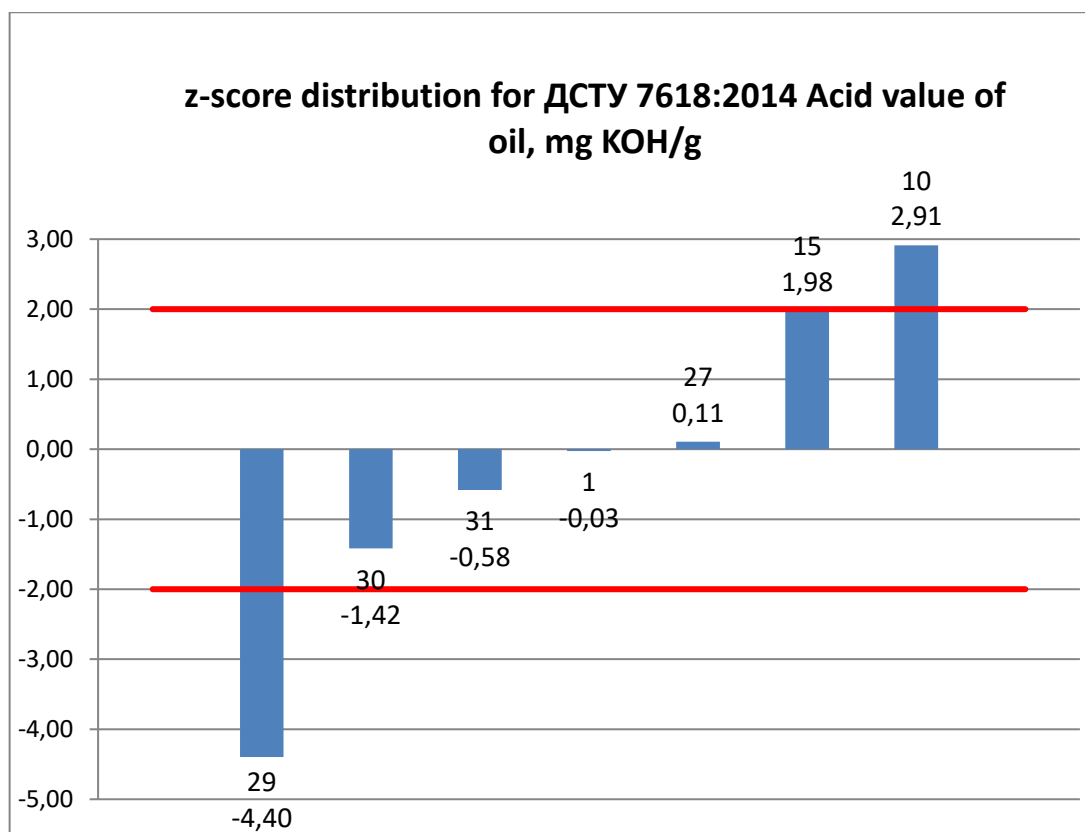
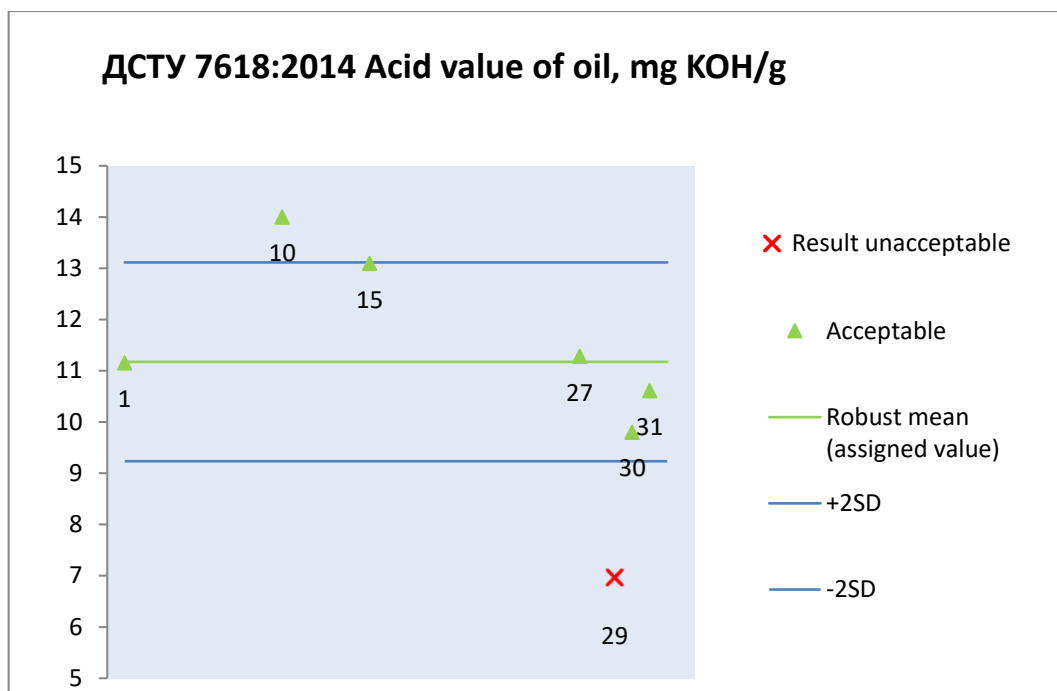
8.13. ISO 6865:2000/ ДСТУ EN ISO 6865:2022 (EN ISO 6865:2000, IDT; ISO 6865:2000, IDT) Crude fibre content, % (Expressed as a mass fraction of the product as received)



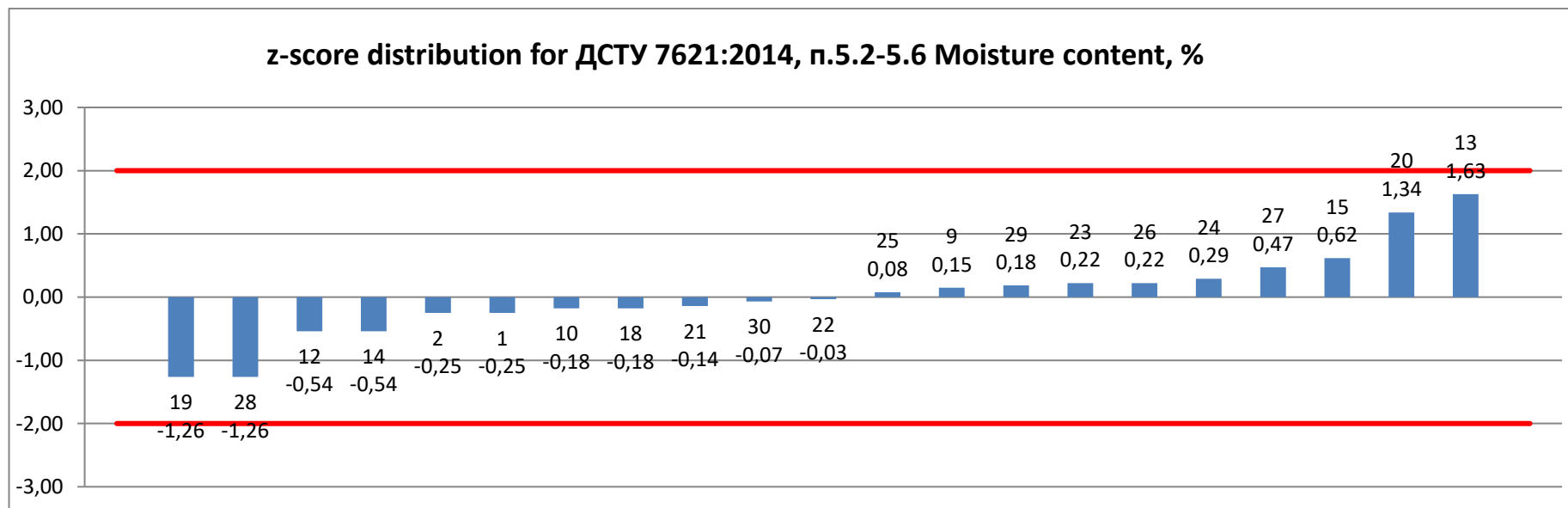
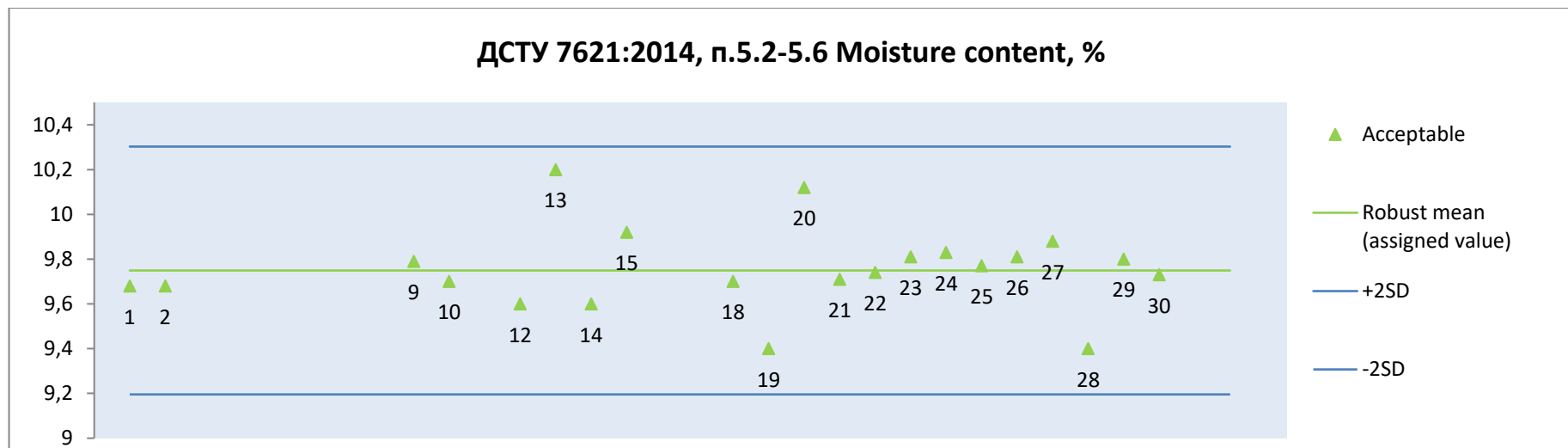
8.14. ISO 12099:2017 Crude fibre content, % (Expressed as a mass fraction of the product as received)



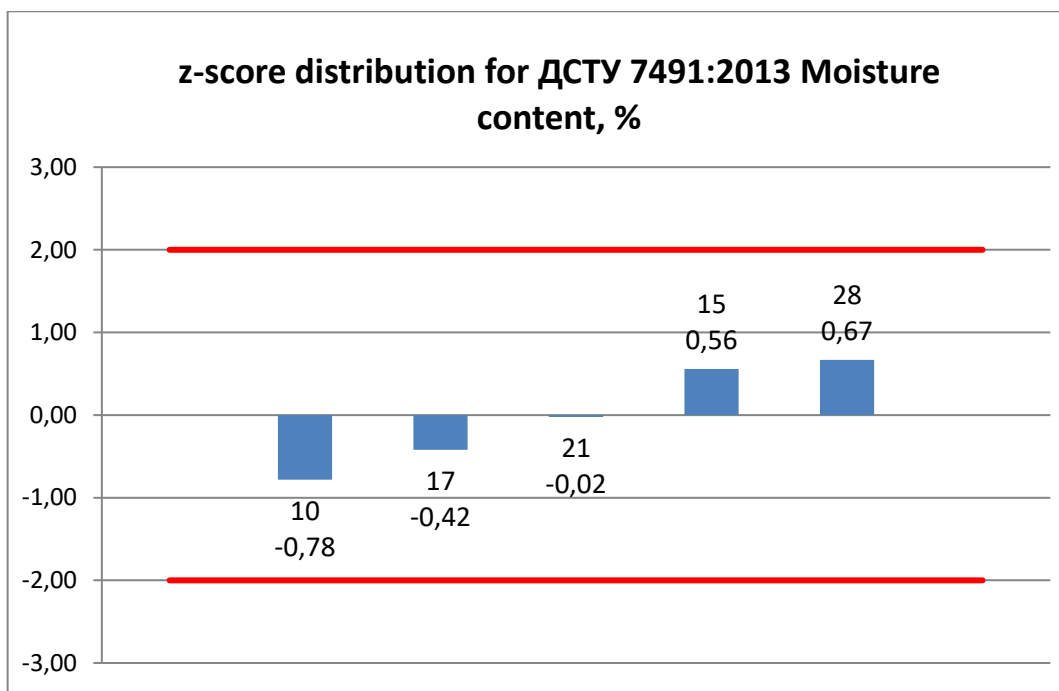
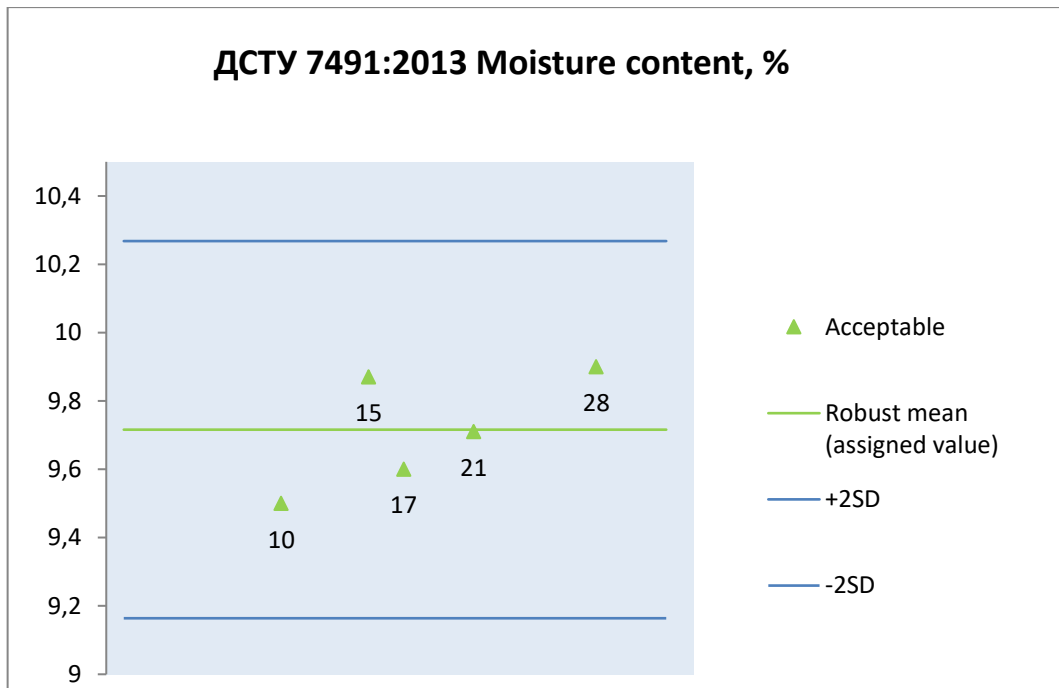
8.15. ДСТУ 7618:2014 Acid value of oil, mg KOH/g



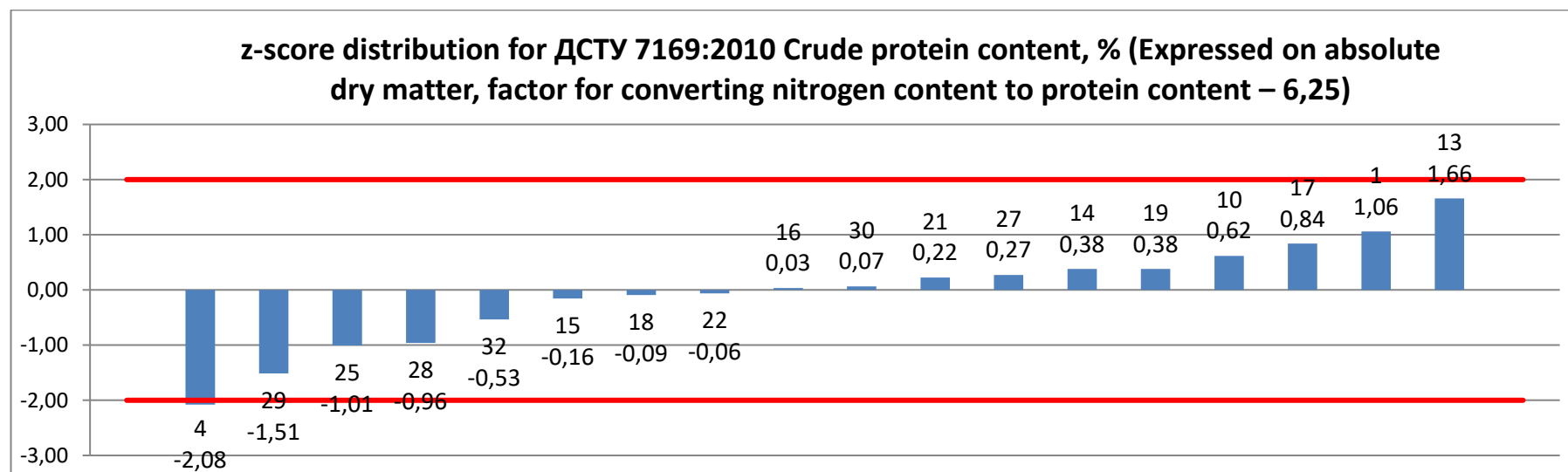
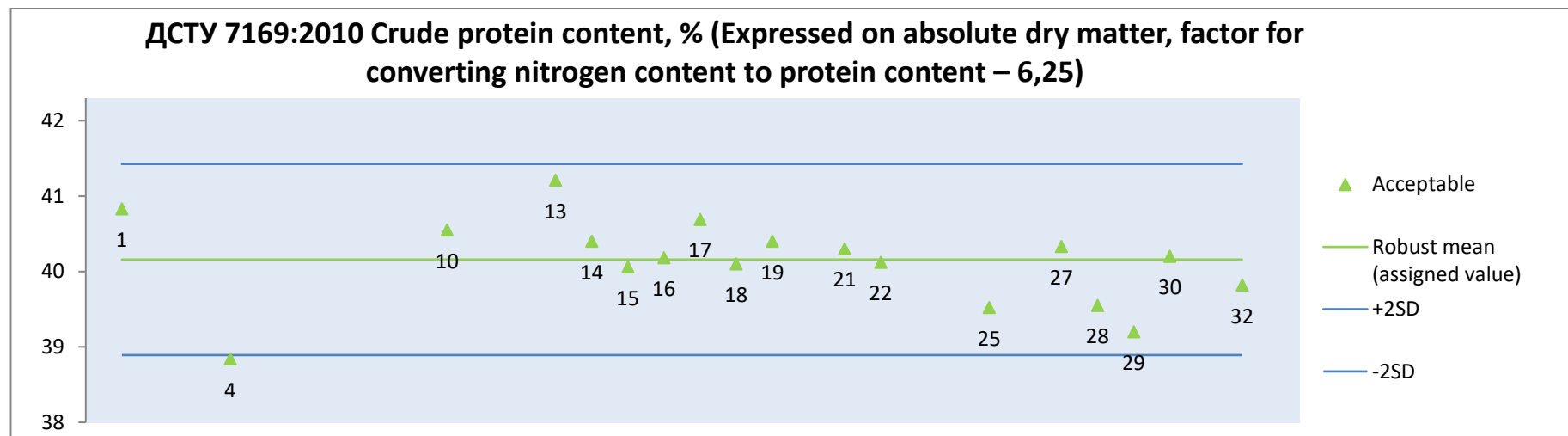
8.16. ДСТУ 7621:2014, п.5.2-5.6 Moisture content, %



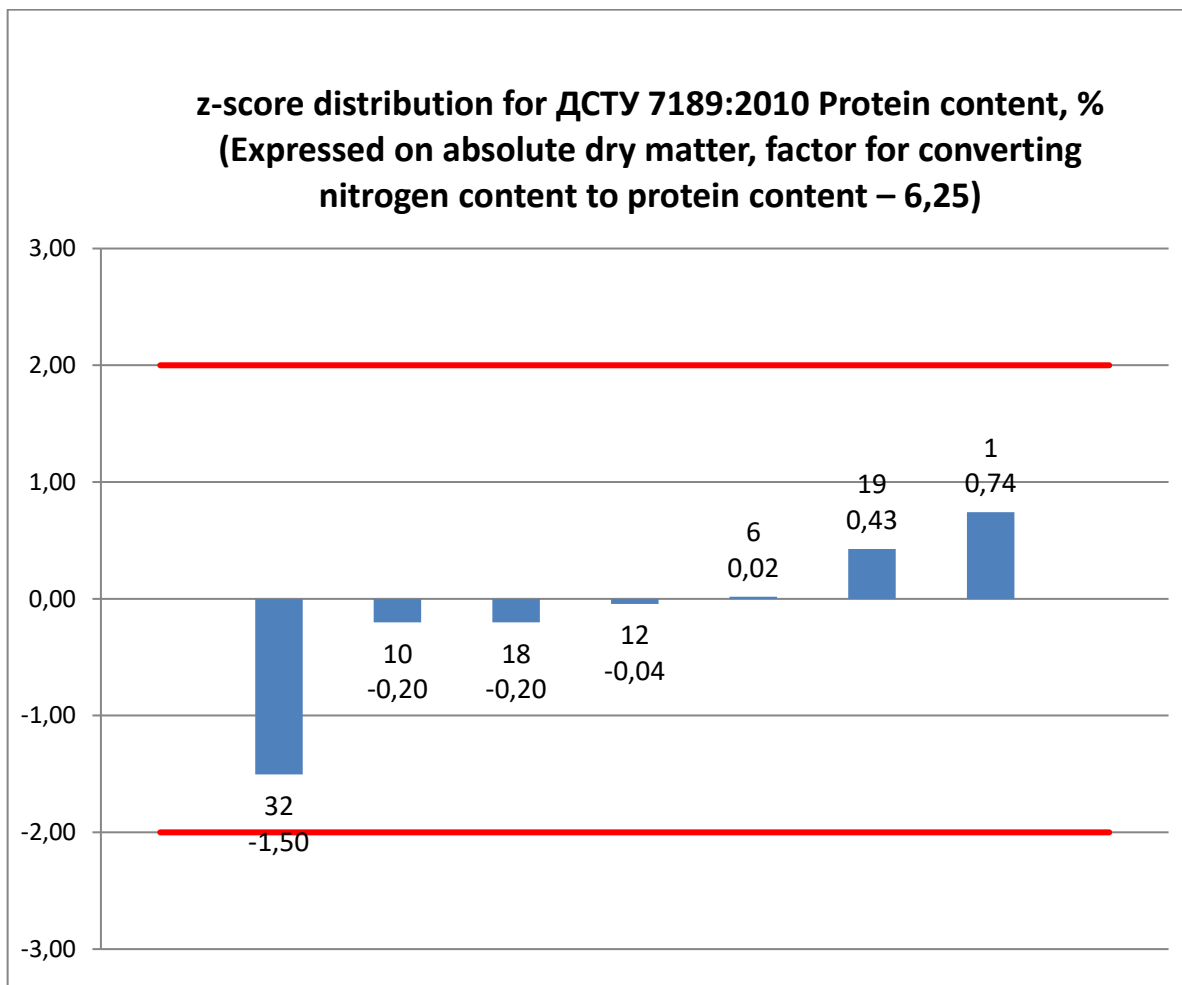
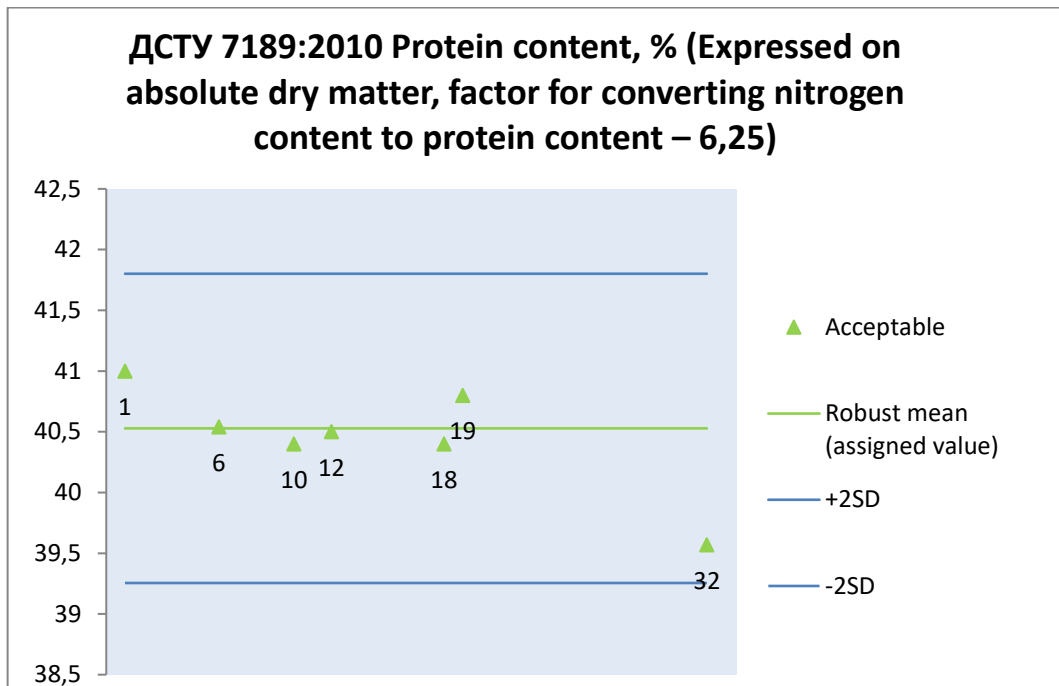
8.17. ДСТУ 7491:2013 Moisture content, %



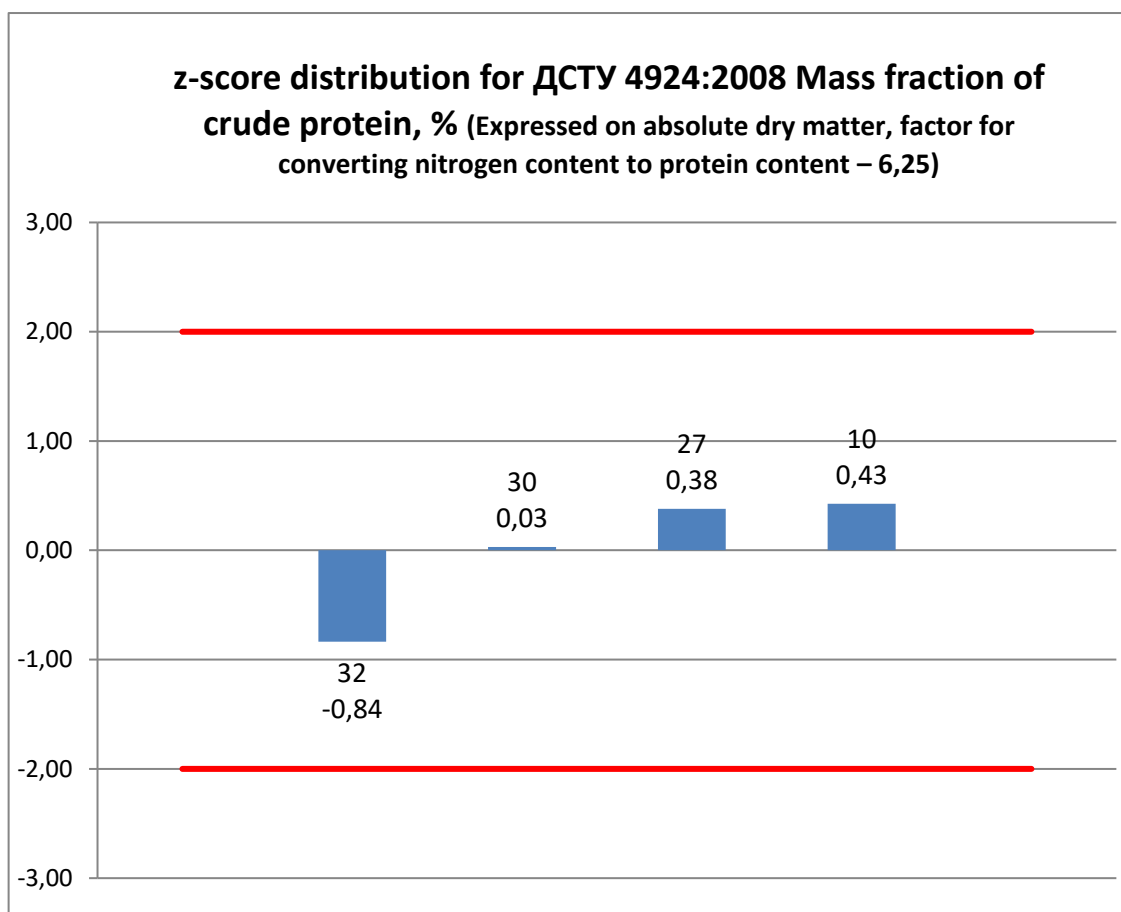
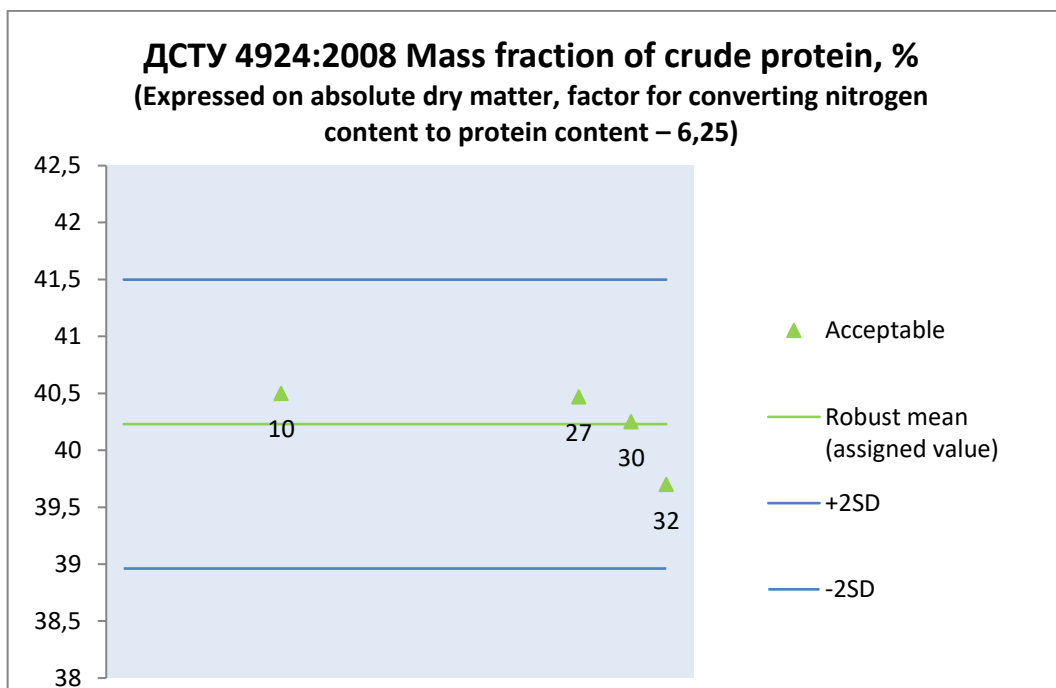
8.18. ДСТУ 7169:2010 Crude protein content, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)



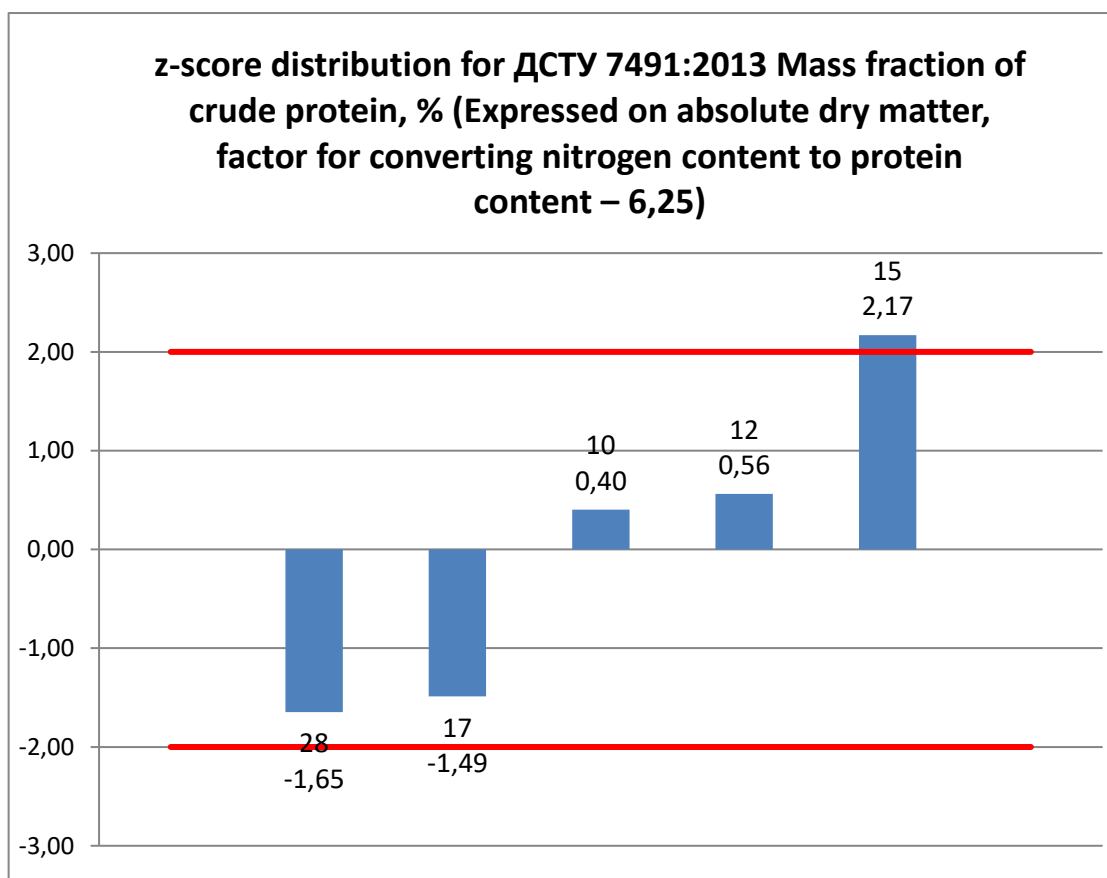
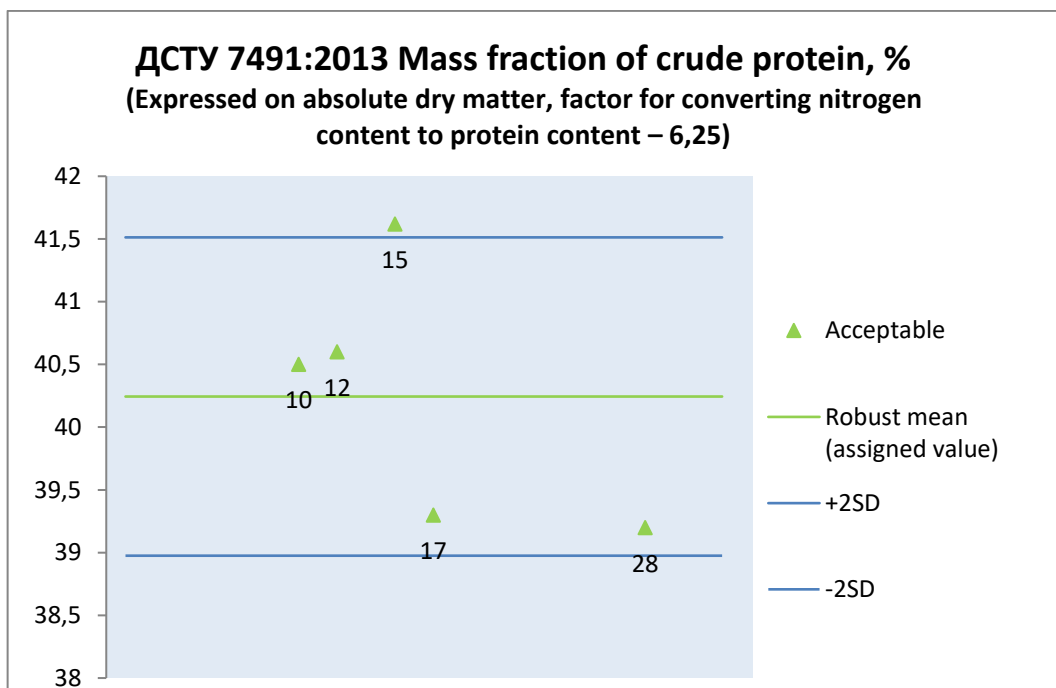
8.19. ДСТУ 7189:2010 Protein content, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)



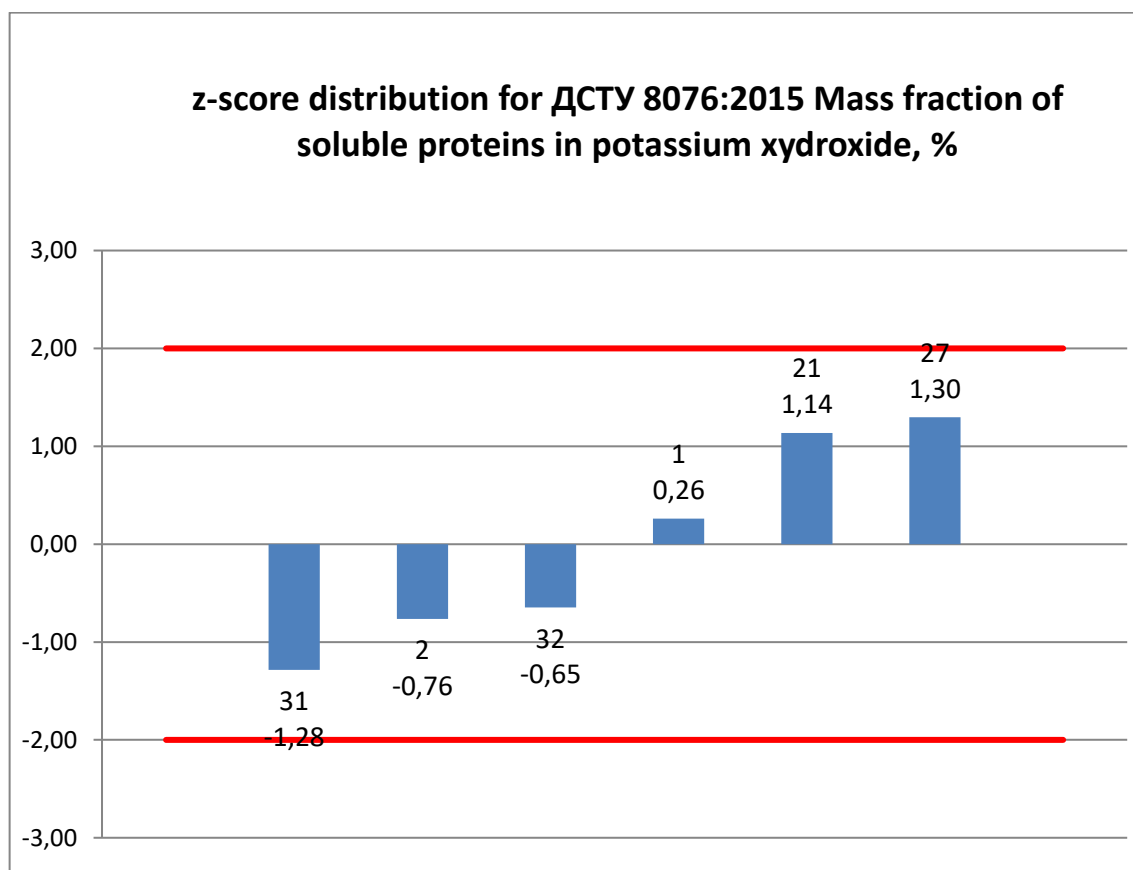
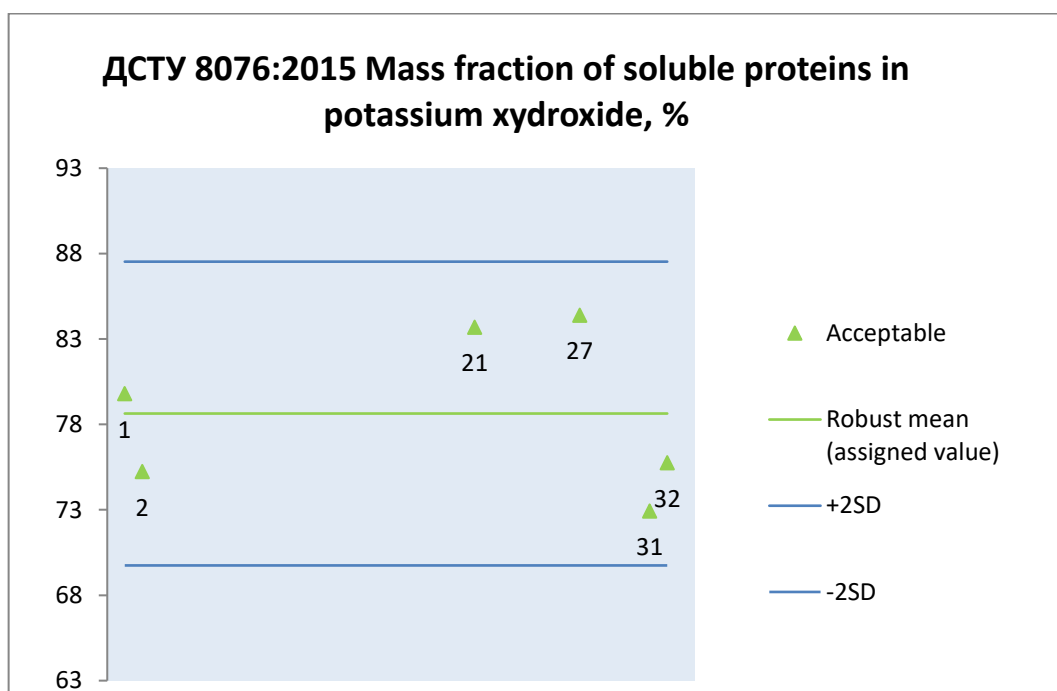
8.20. ДСТУ 4924:2008 Mass fraction of crude protein, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)



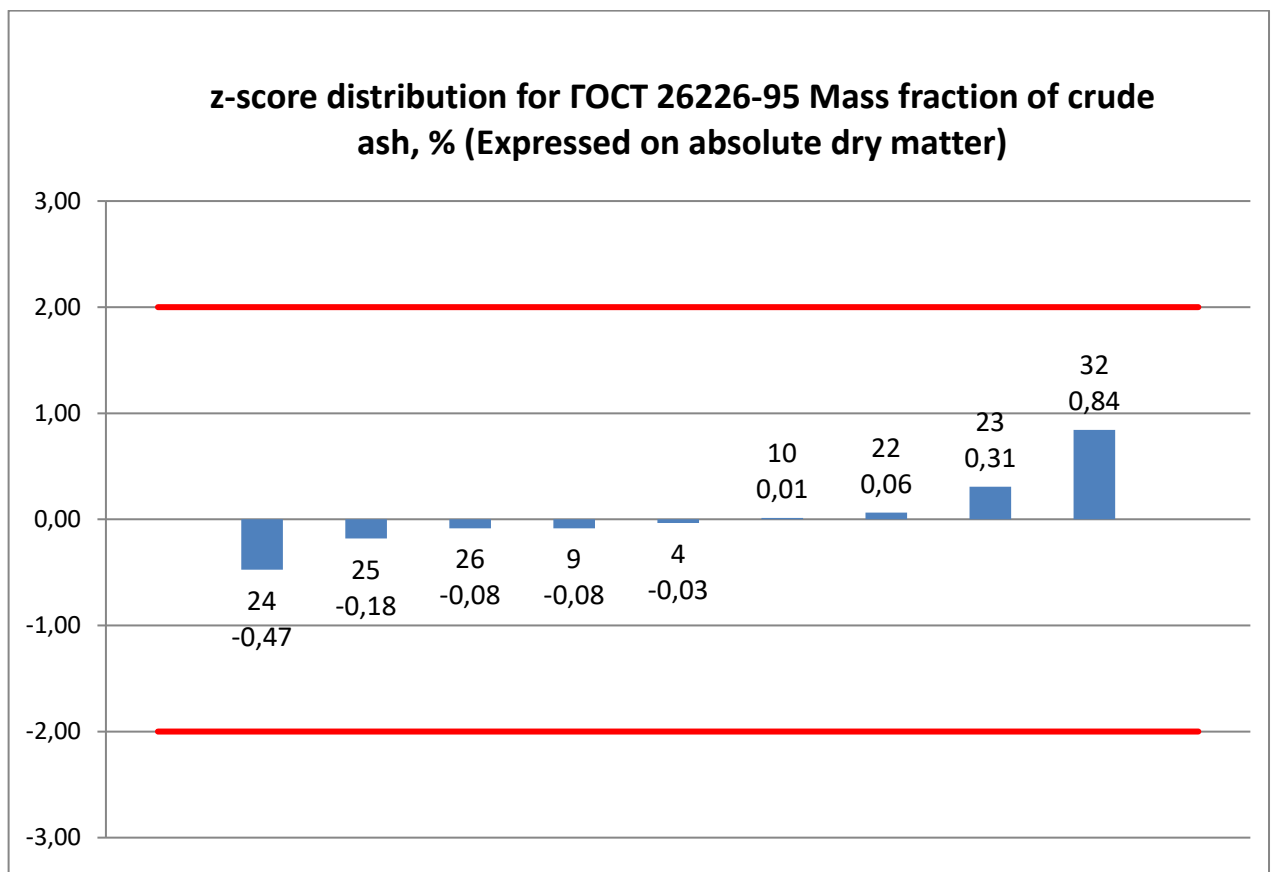
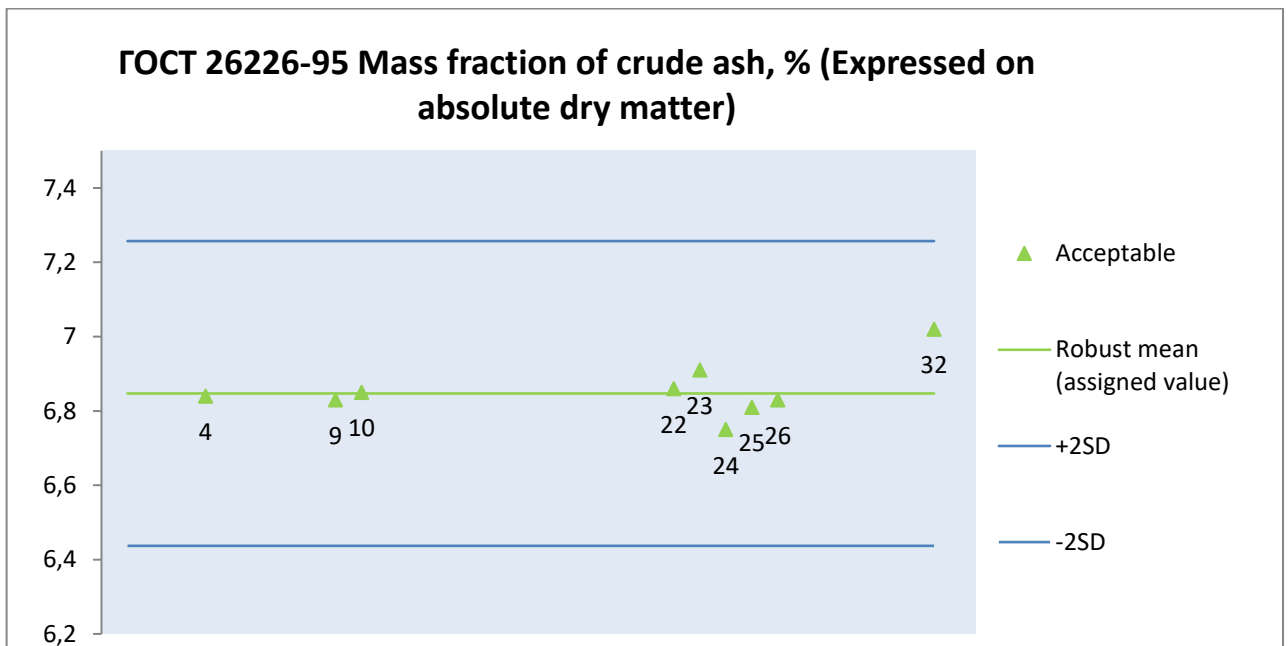
8.21. ДСТУ 7491:2013 Mass fraction of crude protein, % (Expressed on absolute dry matter, factor for converting nitrogen content to protein content – 6,25)



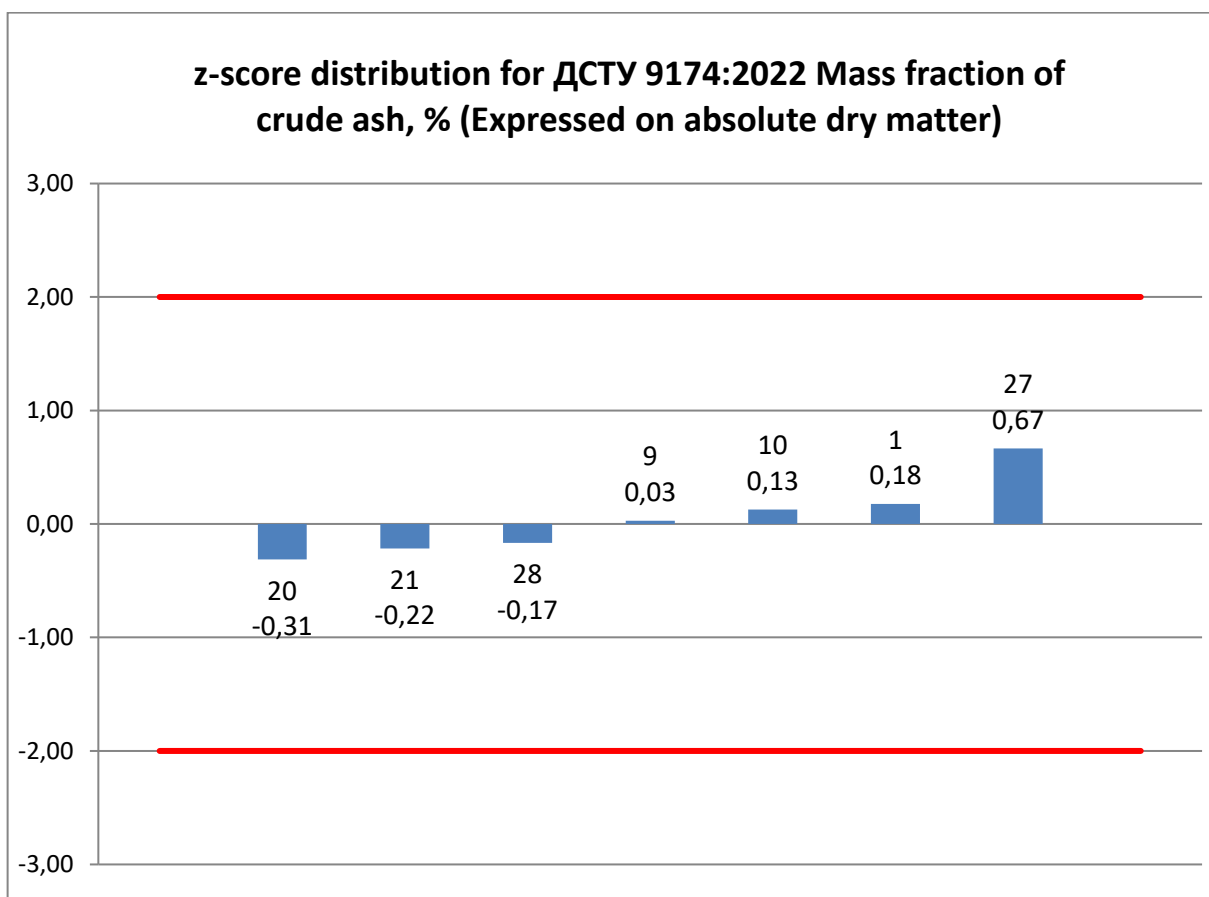
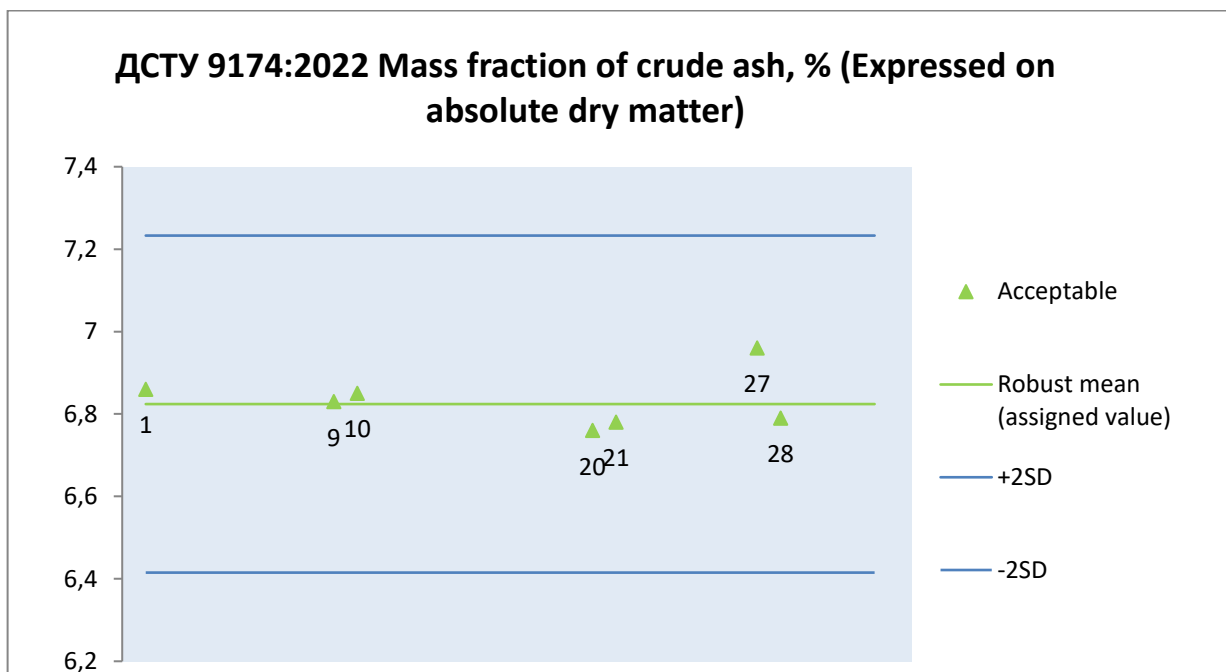
8.22. ДСТУ 8076:2015 Mass fraction of soluble proteins in potassium hydroxide, %



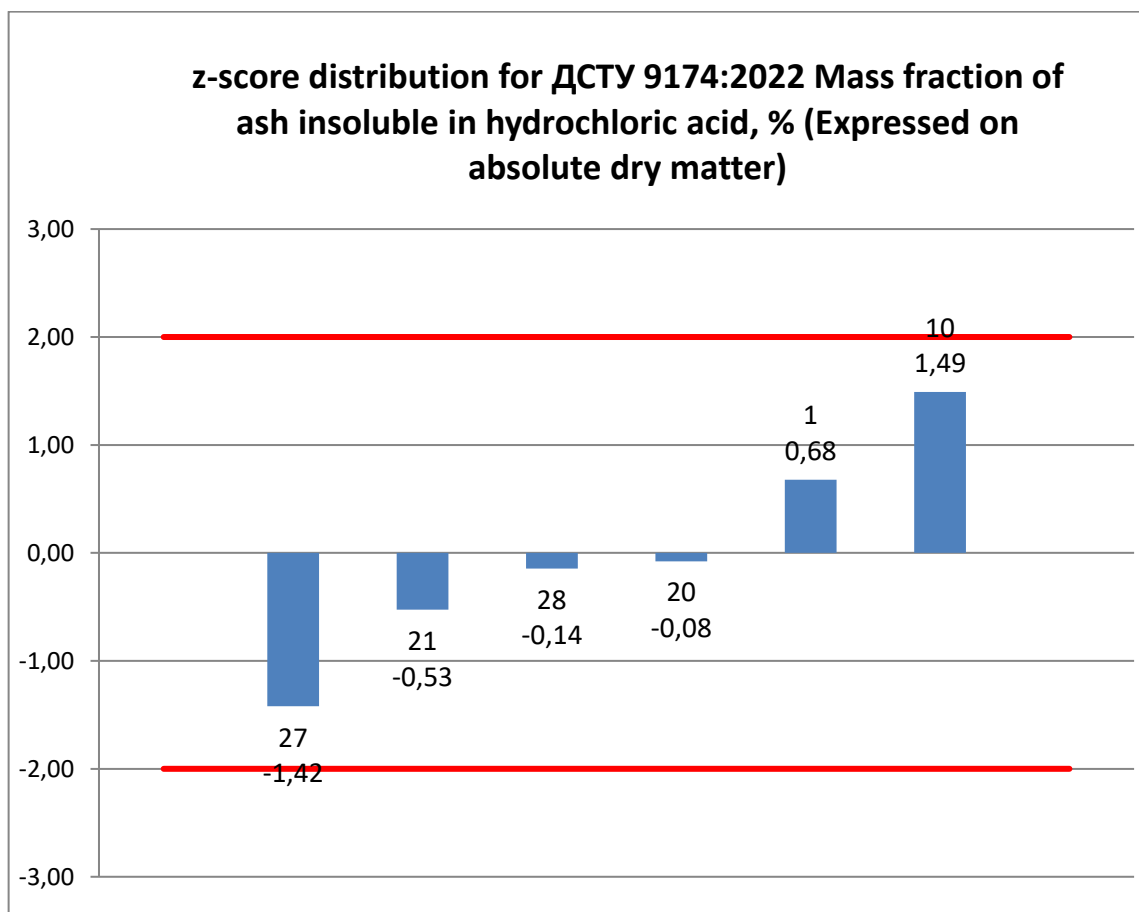
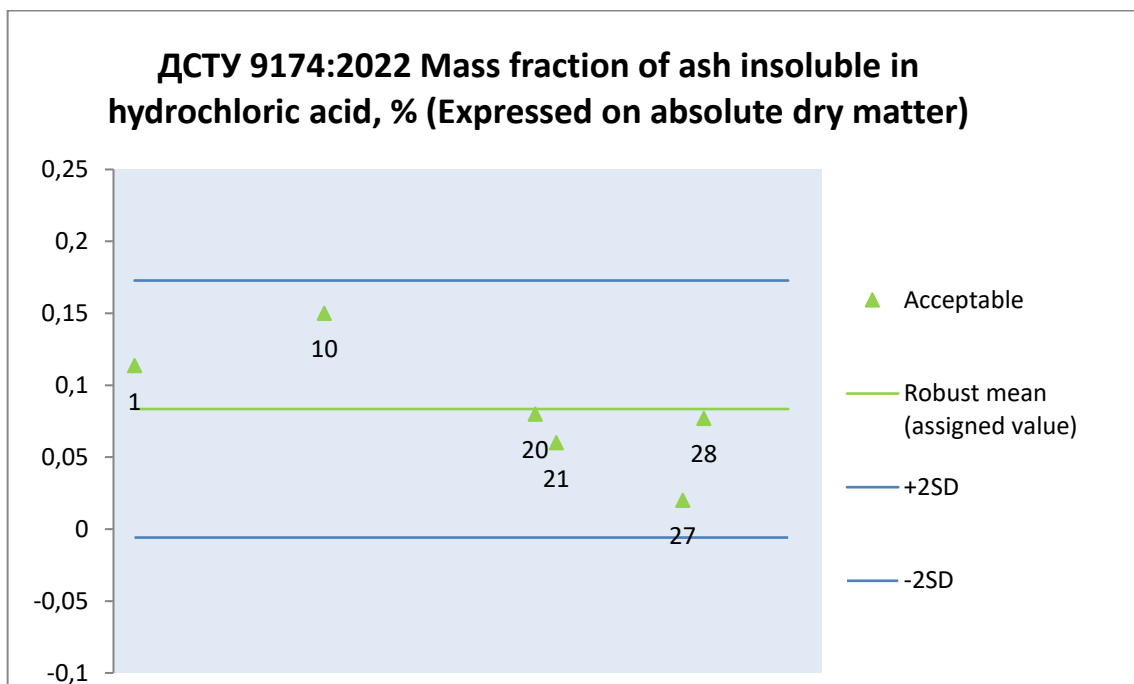
8.23. ГOCT 26226-95 Mass fraction of crude ash, % (Expressed on absolute dry matter)



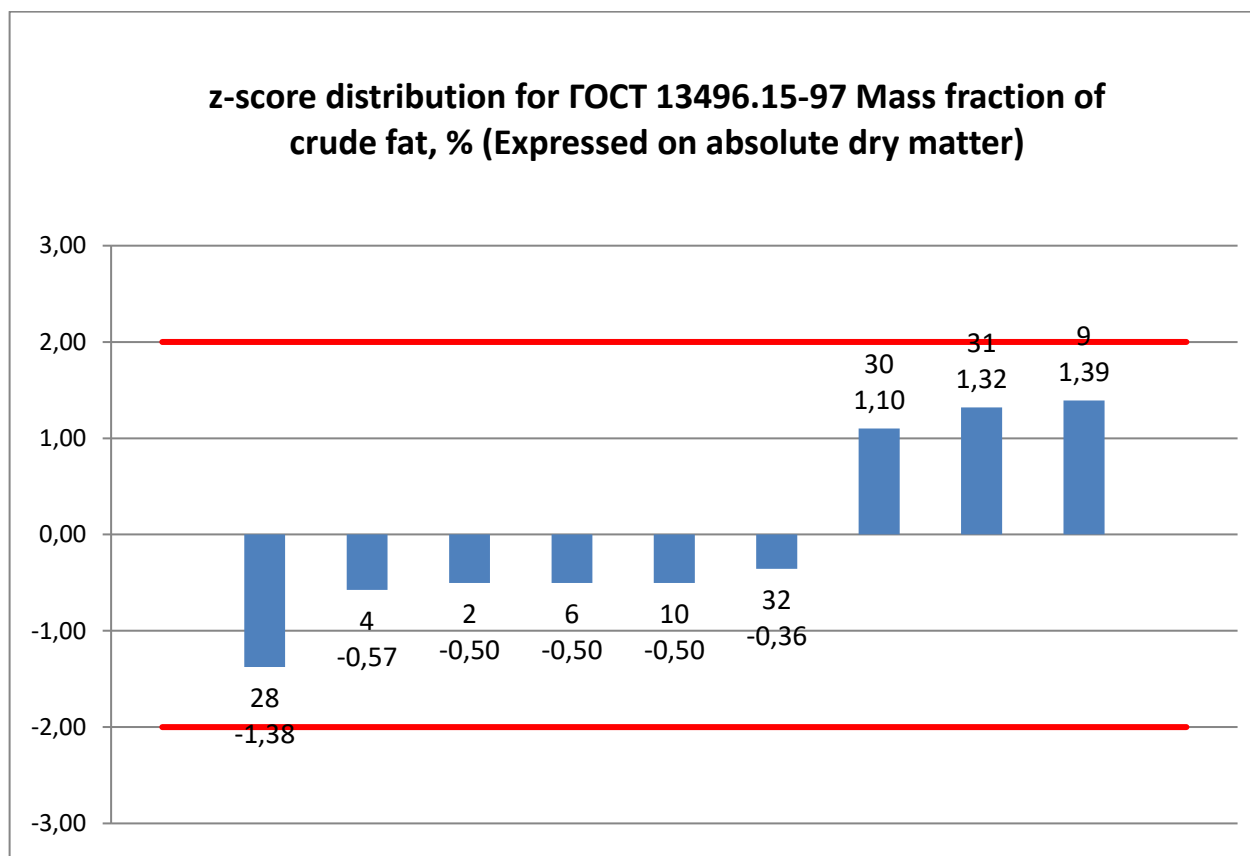
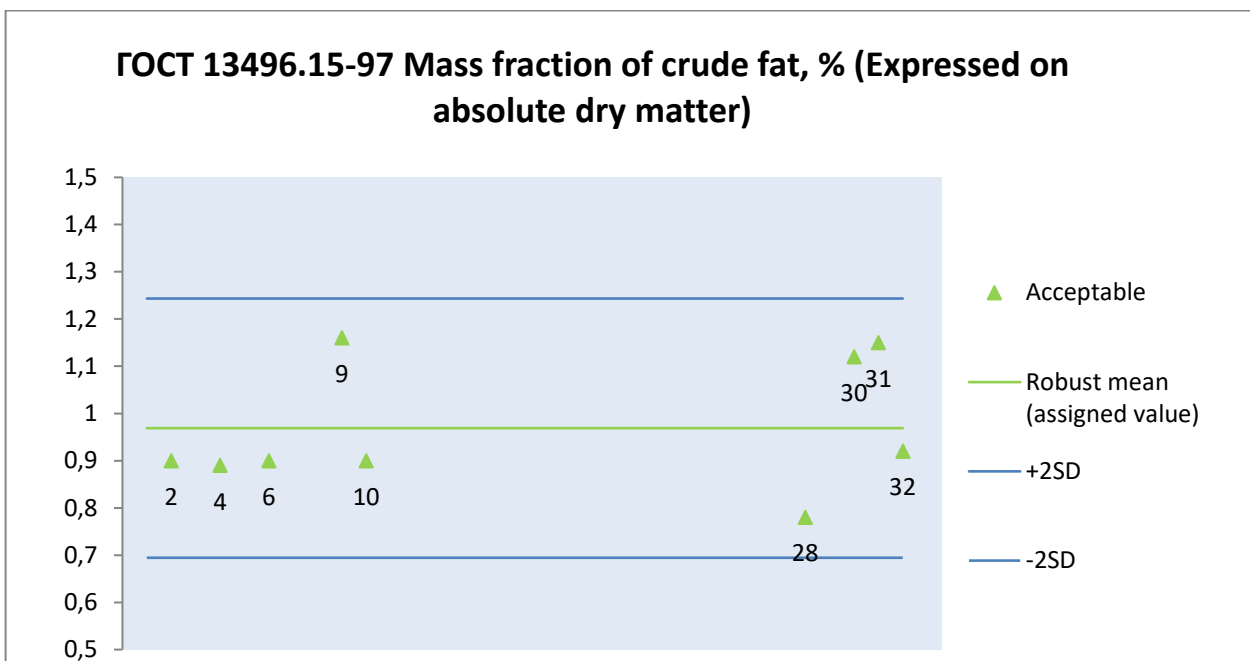
8.24. ДСТУ 9174:2022 Mass fraction of crude ash, % (Expressed on absolute dry matter)



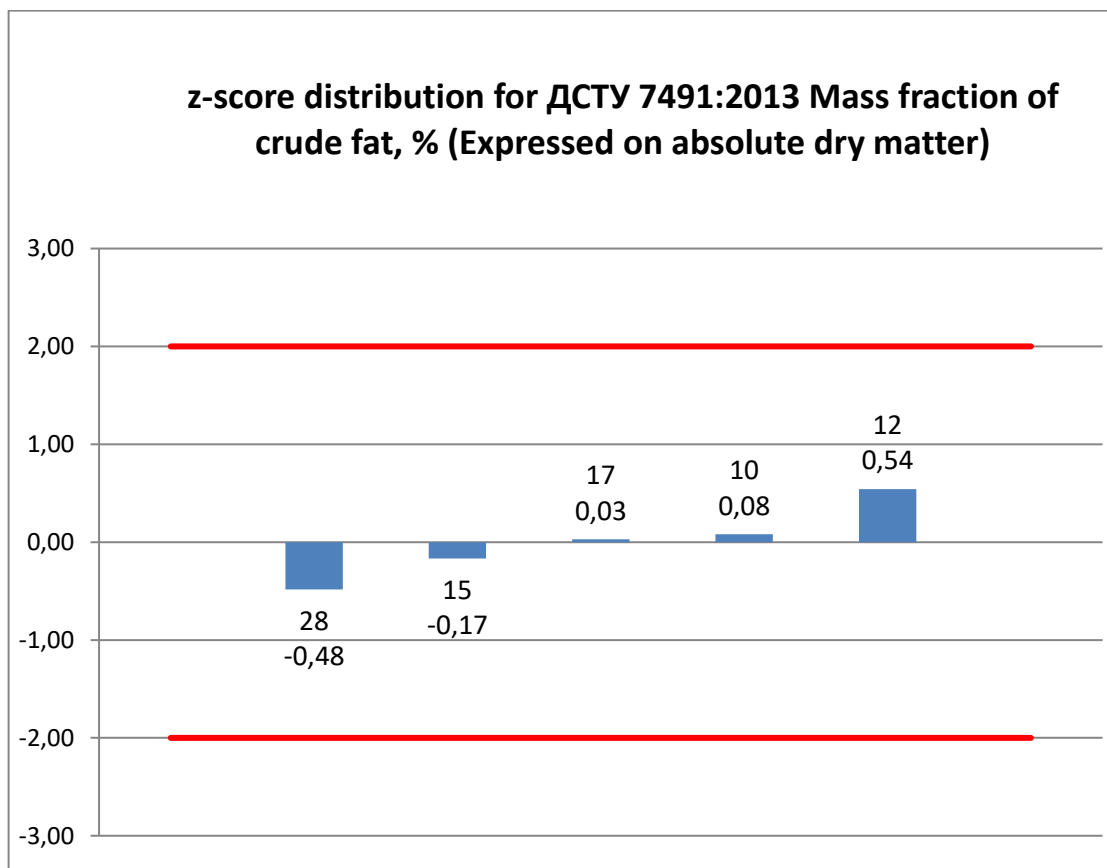
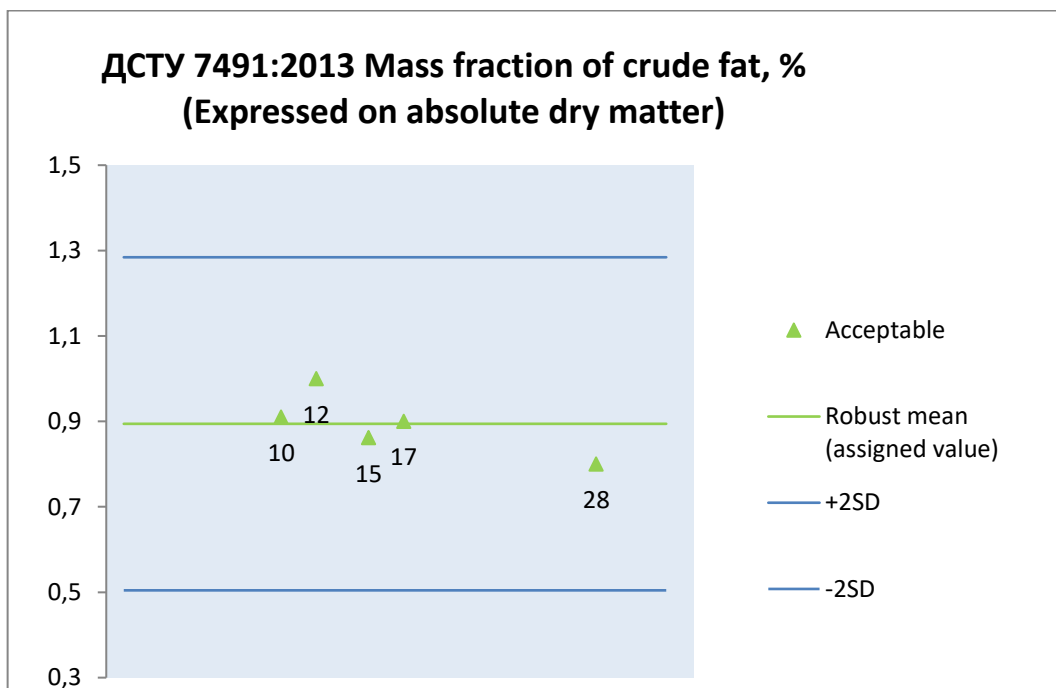
**8.25. ДСТУ 9174:2022 Mass fraction of ash insoluble in hydrochloric acid, %
(Expressed on absolute dry matter)**



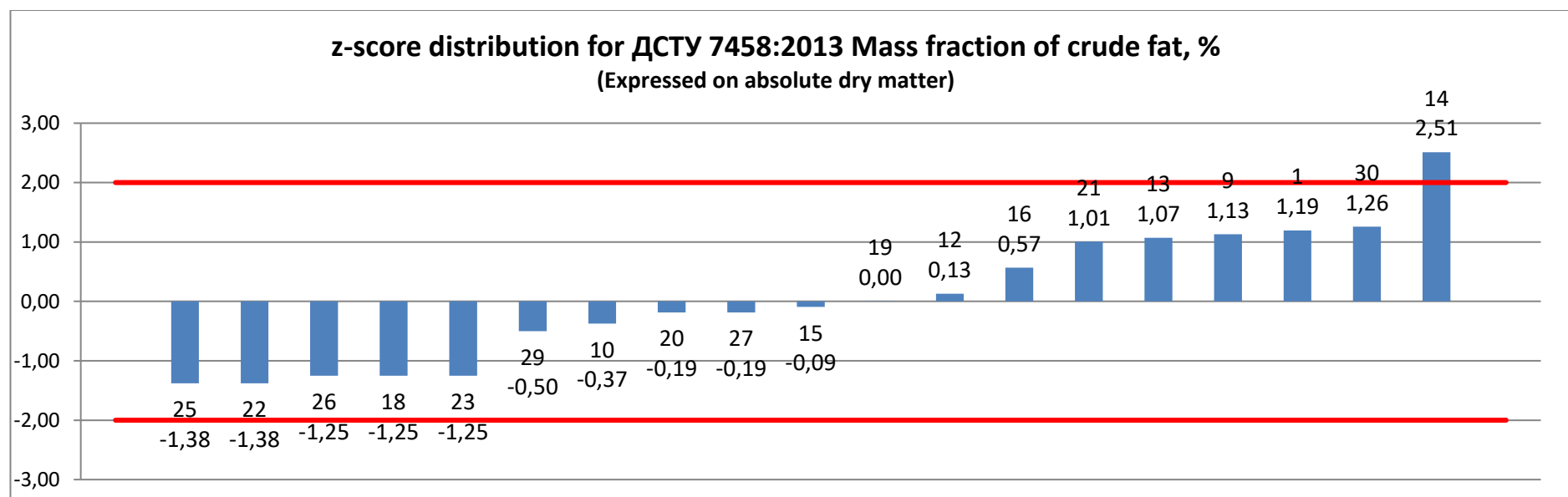
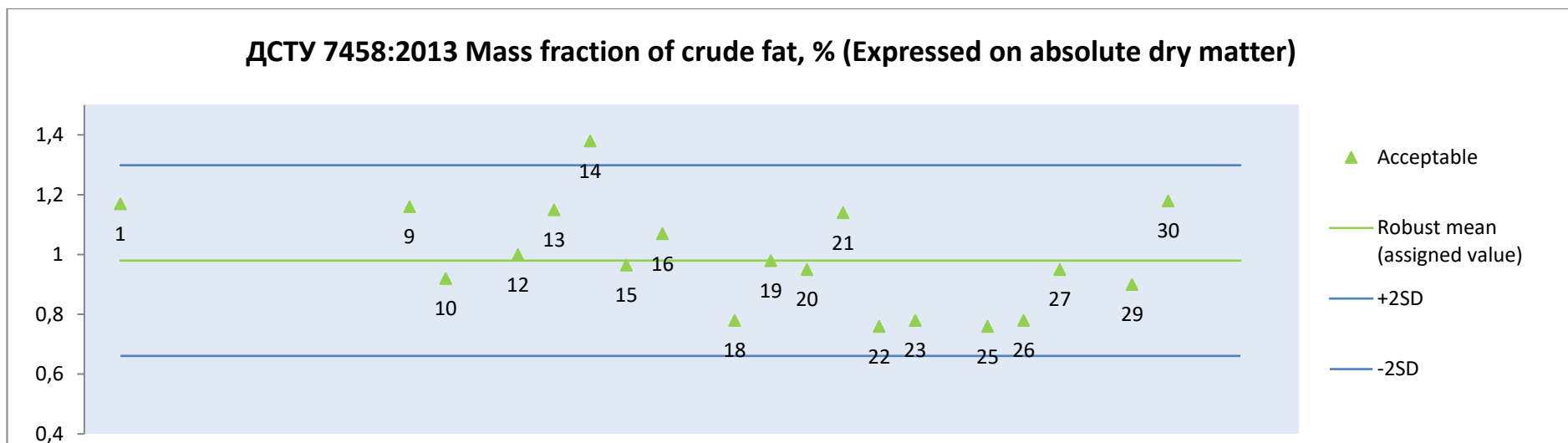
8.26. GOCT 13496.15-97 Mass fraction of crude fat, % (Expressed on absolute dry matter)



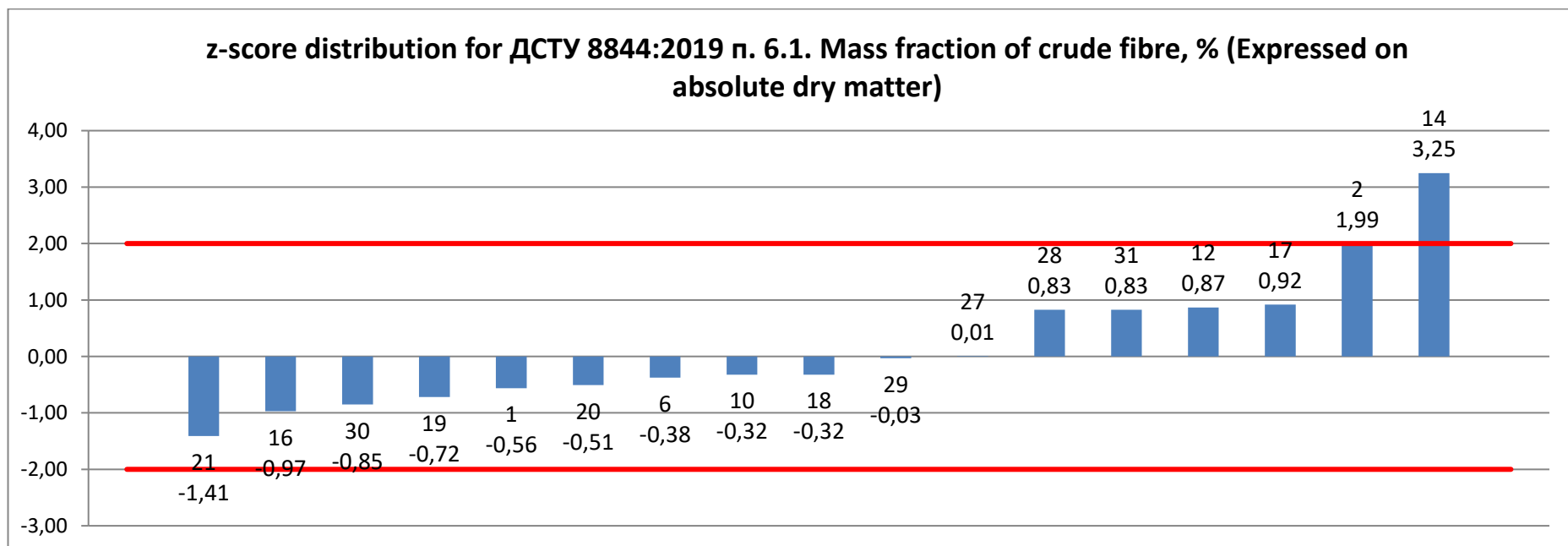
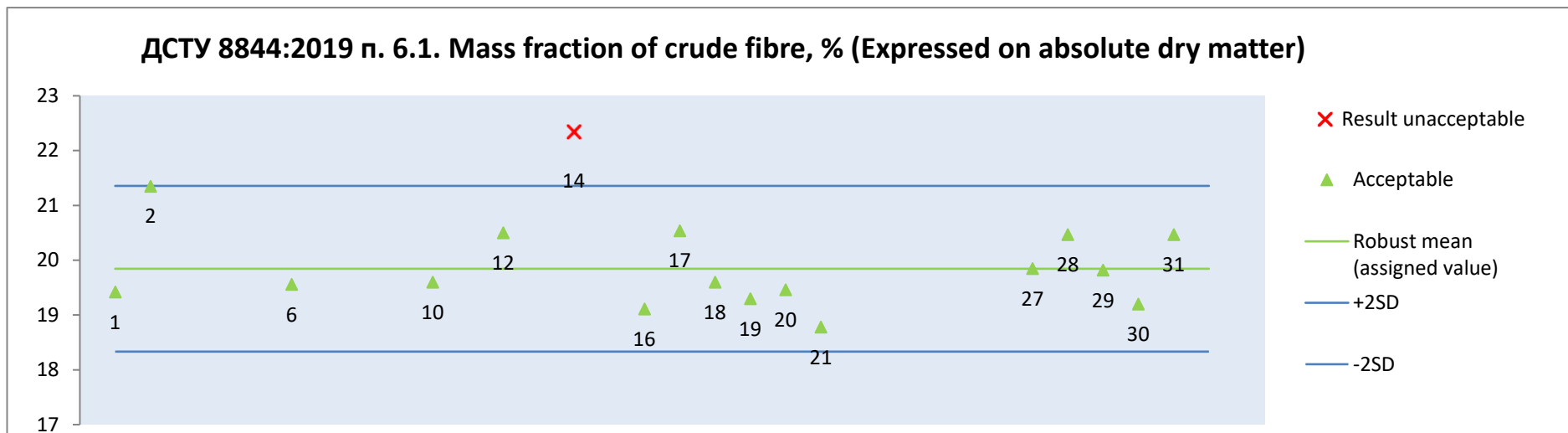
8.27. ДСТУ 7491:2013 Mass fraction of crude fat, % (Expressed on absolute dry matter)



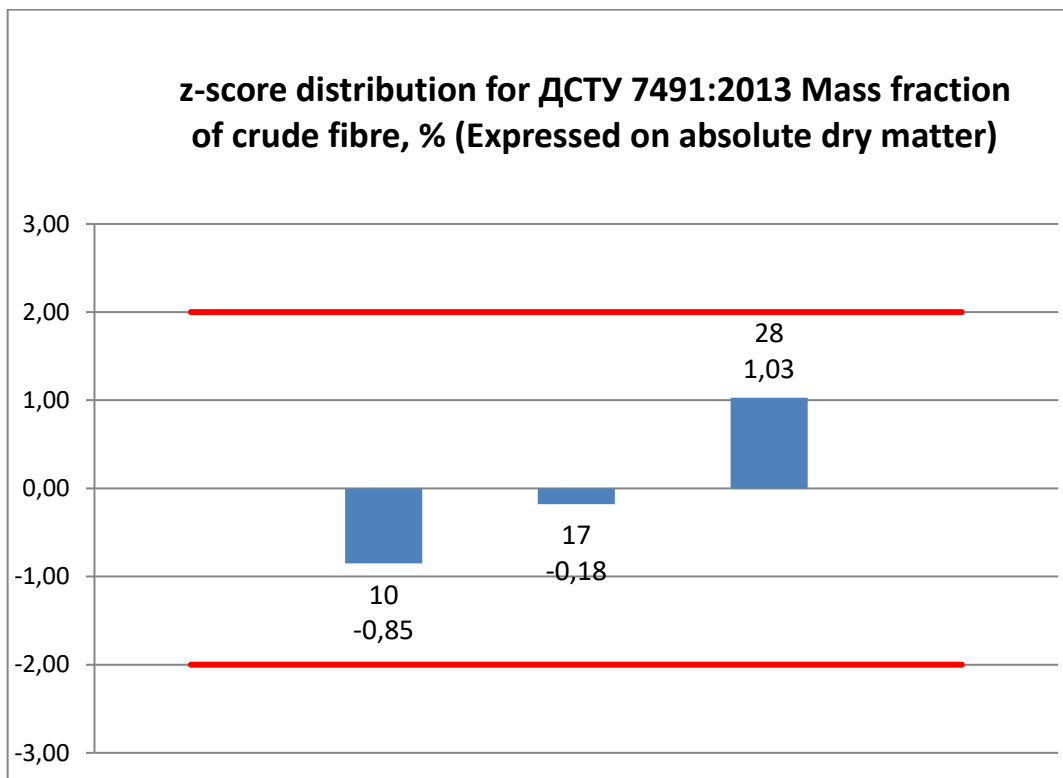
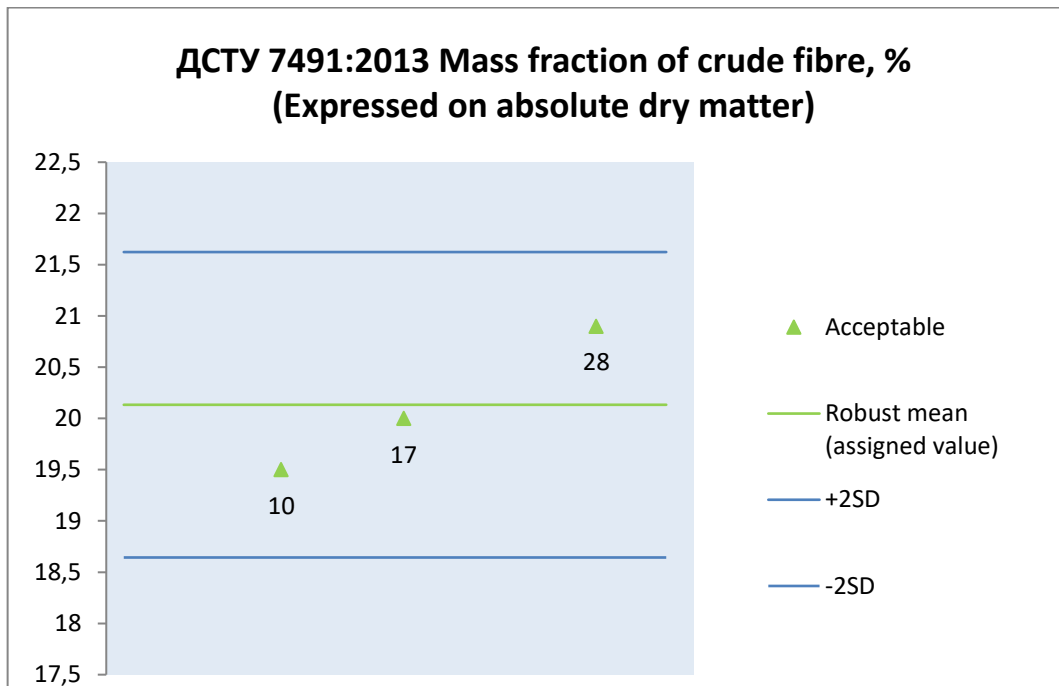
8.28. ДСТУ 7458:2013 Mass fraction of crude fat, % (Expressed on absolute dry matter)



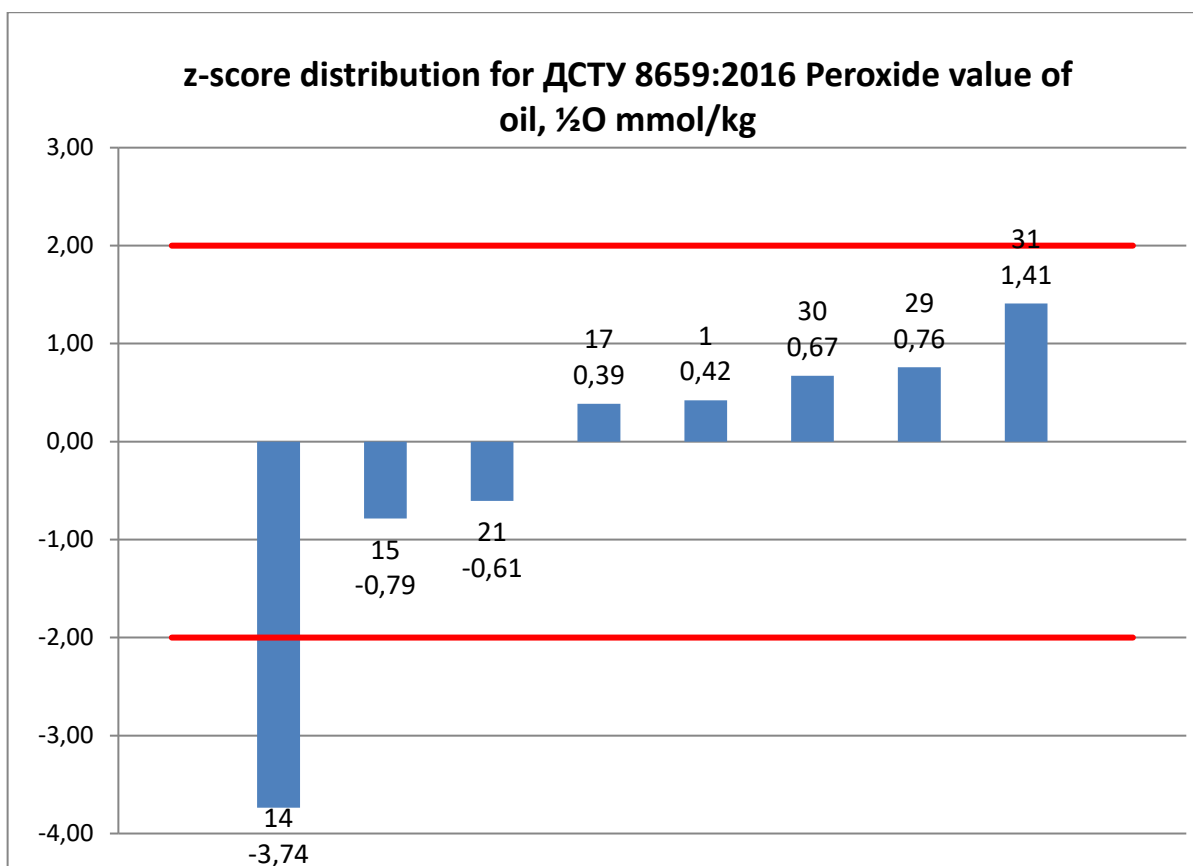
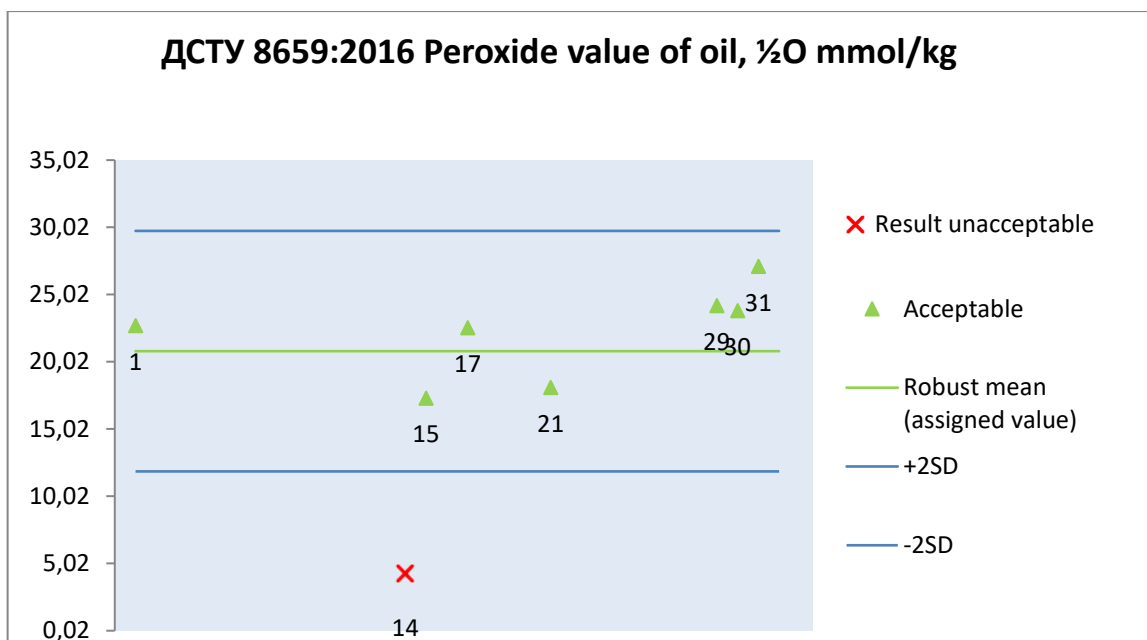
8.29. ДСТУ 8844:2019 п. 6.1. Mass fraction of crude fibre, % (Expressed on absolute dry matter)



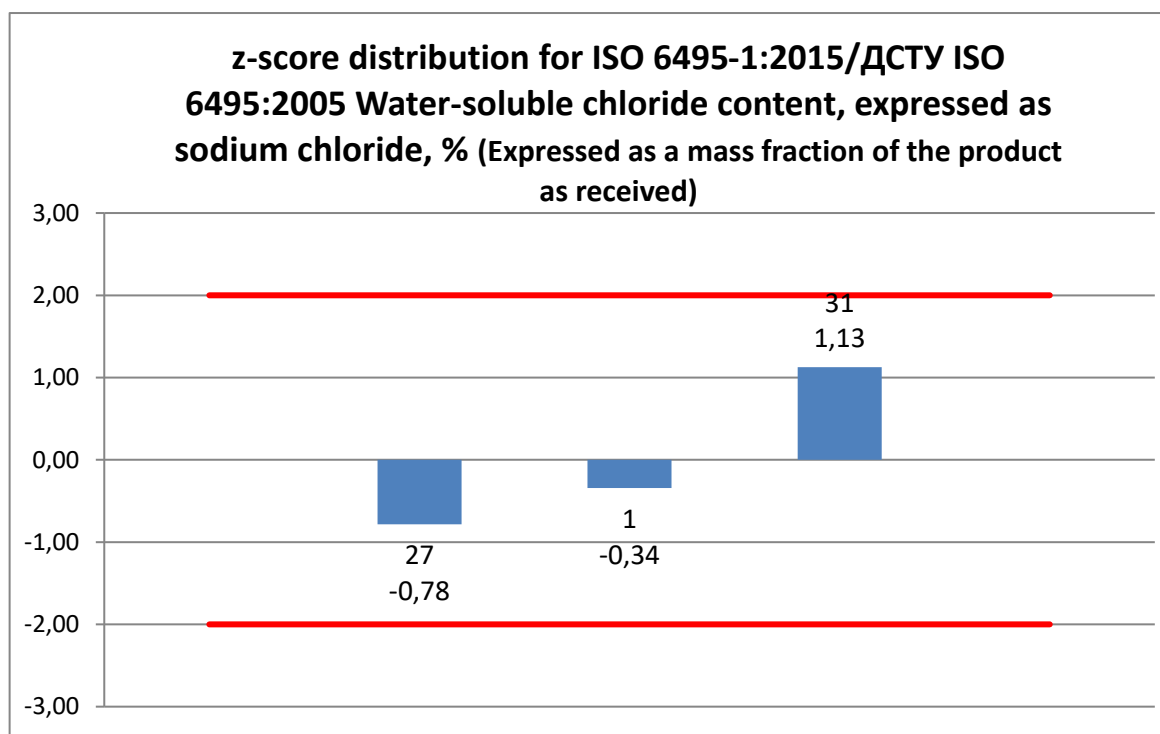
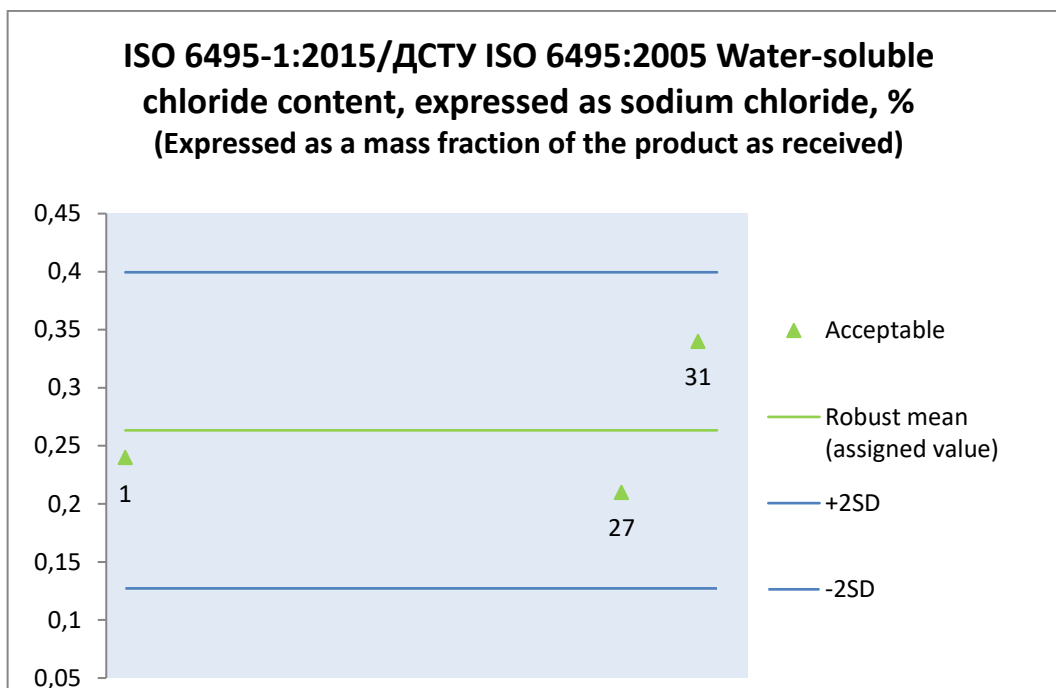
8.30. ДСТУ 7491:2013 Mass fraction of crude fibre, % (Expressed on absolute dry matter)



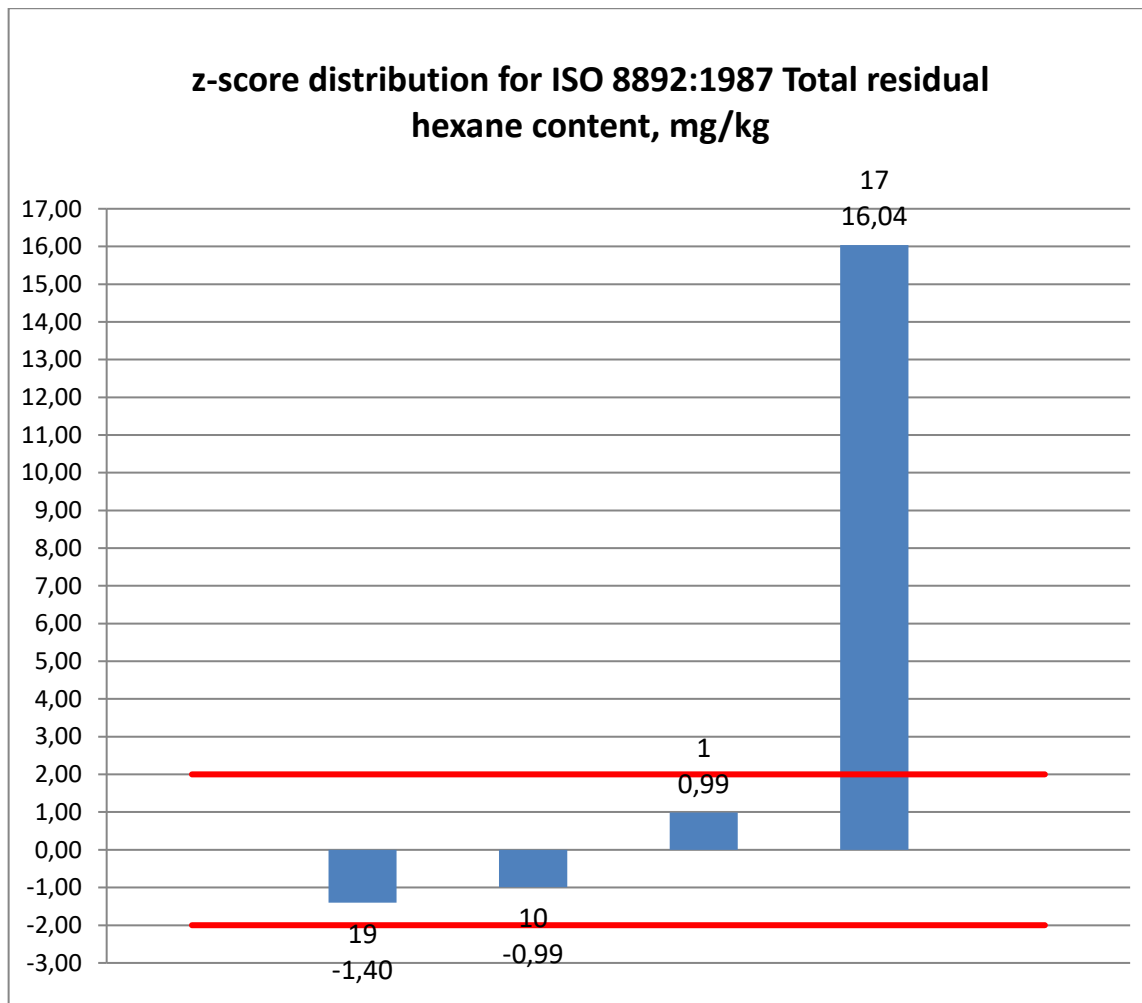
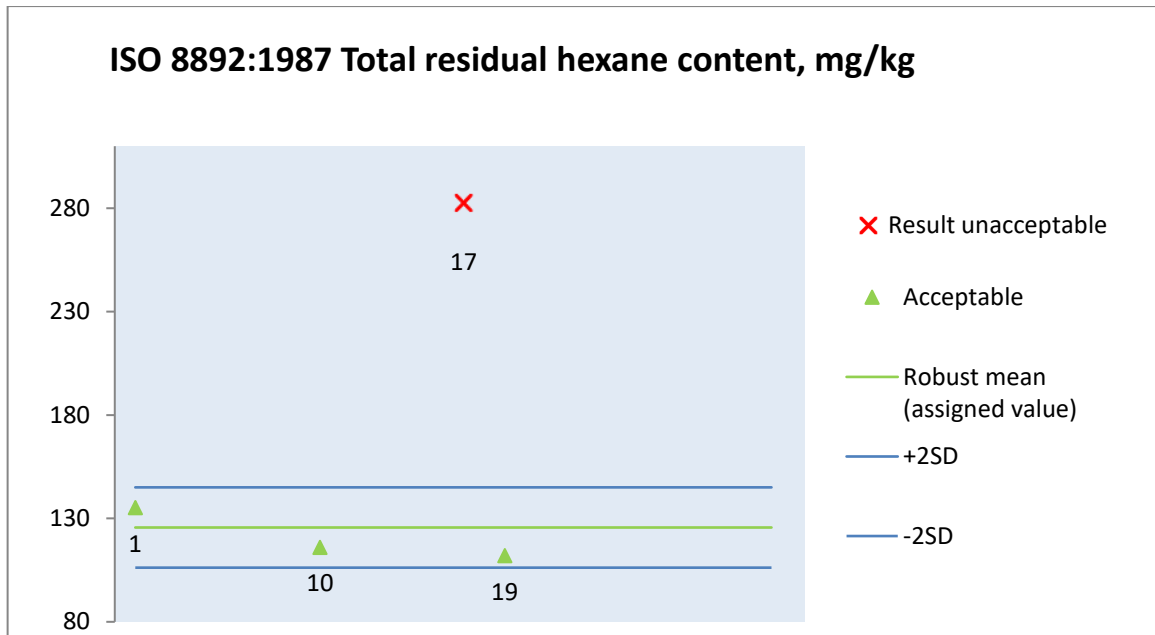
8.31. ДСТУ 8659:2016 Peroxide value of oil, ½O mmol/kg



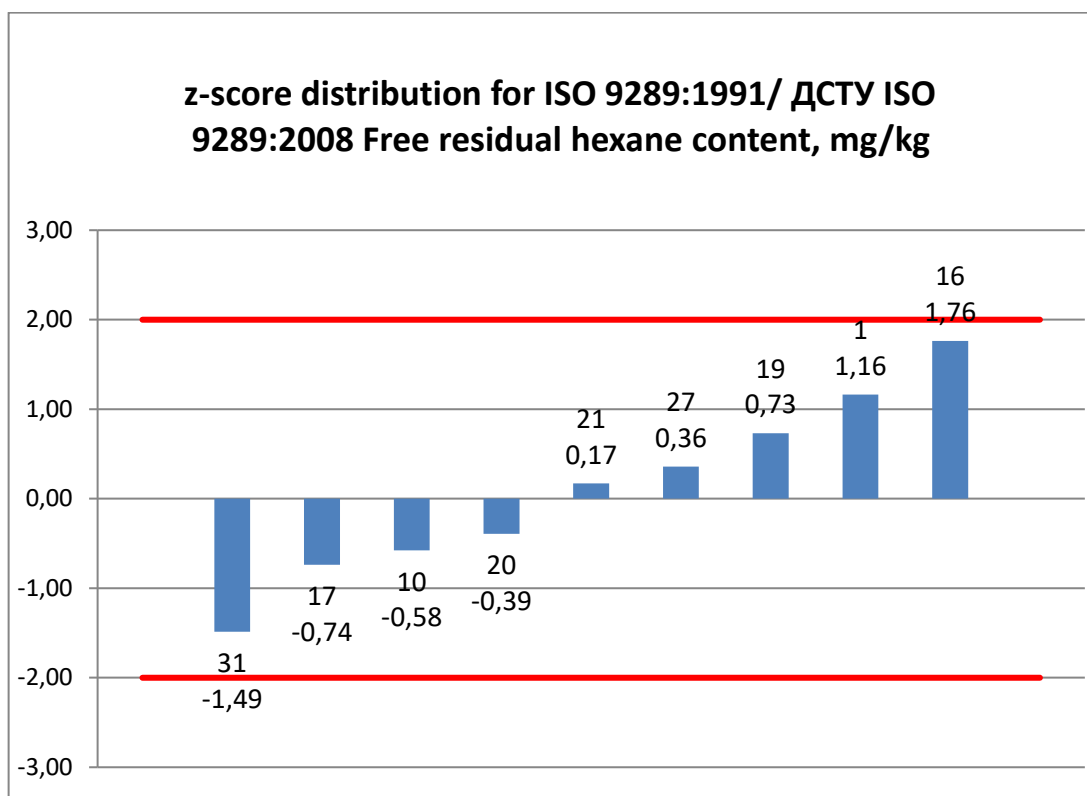
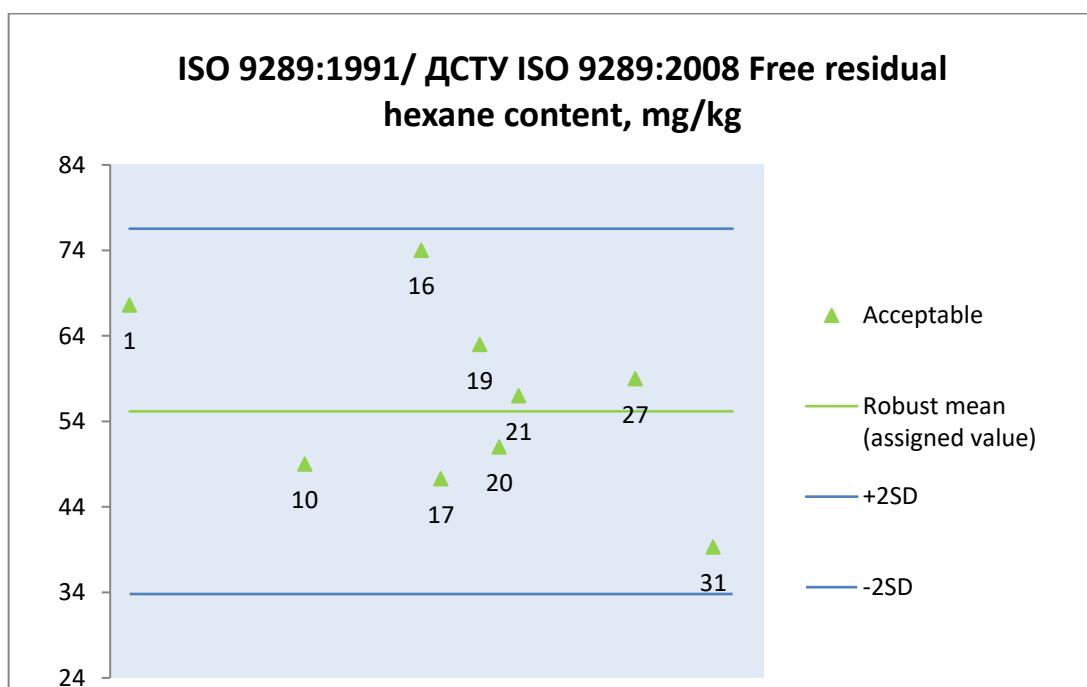
8.32. ISO 6495-1:2015/ДСТУ ISO 6495:2005 Water-soluble chloride content, expressed as sodium chloride, % (Expressed as a mass fraction of the product as received)



8.33. ISO 8892:1987 Total residual hexane content, mg/kg



8.34. ISO 9289:1991/ ДСТУ ISO 9289:2008 Free residual hexane content, mg/kg



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.