



PROFICIENCY TESTING PT.UA.1.1.2016
GRAIN ANALYSIS FOR QUALITY
PROFICIENCY TESTING REPORT
ROUND 1 NOVEMBER 2016(ENG)

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Status:	Final

Kyiv-2016

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2. SUMMARY

2.1. The purpose of proficiency testing in grain testing is to determine the characteristics of the operation (as described in ISO\IEC 17043[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.1.1.2016 Round 1 held in November 2016. This report is issued according to ISO\IEC 17043 [1] and PT.UA.1.1.2016 Round 1 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. Test material - **Wheat**(*Triticum aestivum*) for the PT.UA.1.1.2016 Round 1 proficiency testing scheme were dispatched on 04.11.2016 according to PT programme.

2.5. A total of 13 participants in 2 countries received one sample. Results were returned from 13 participants. One participant reported results only by two methods of the required. The countries evolved in this round were as follows:

Ukraine	11
Russia Federation	2

2.6. The assigned value for each analyte was calculated as the robust mean of the trial data using Huber H15 method [2,3]

2.7. The target standard deviation for each analyte was chosen from either the appropriate form of the Horwitz equation or the trial standard deviation (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. z-Scores were deemed satisfactory if $|z| \leq 2$. z-Scores were deemed questionable if $2 < |z| \leq 3$. The calculations were made according to [3,5].

2.8. Surplus samples from this round are available for sale as certified reference materials with the certified values and uncertainties stated in clause 4. Please email Provider for details

3. HOMOGENITY AND STABILITY ASSESMENT

3.1. Samples were assessed for homogeneity and stability after blending and packing by selecting ten samples of material at random from all those produced. Each of these samples were tested in duplicate under repeatability conditions. Samples for stability tests were stored in appropriate conditions for the period of preparation and test submission for this round.

3.2. 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 [3,4].

3.3. Produced samples were found to be sufficiently homogeneous for every method/analyte according to programme.

3.4. Worked example using Protein content(ISO 20483) data.

Вміст білка в перерахунку на суху речовину (Nx5.7), %				ISO 20483							
Crude protein content on dry matter (Nx5.7),%				ISO 20483							
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'					
	Номер зразку/ Sample number	Результат/ Result A	Результат/ Result B	Average	SD ²		Номер зразку/ Sample number	Результат/ Result A	Результат/ Result B	SUM	Difference ²
2016-2	1	11,39	11,44	11,42	0,00125	2016-2	1	11,39	11,44	22,83	0,0025
2016-6	2	11,55	11,42	11,49	0,00845	2016-6	2	11,55	11,42	22,97	0,0169
2016-10	3	11,64	11,66	11,65	0,0002	2016-10	3	11,64	11,66	23,30	0,0004
2016-12	4	11,66	11,65	11,66	5E-05	2016-12	4	11,66	11,65	23,31	0,0001
2016-15	5	11,28	11,46	11,37	0,0162	2016-15	5	11,28	11,46	22,74	0,0324
2016-16	6	11,72	11,61	11,67	0,00605	2016-16	6	11,72	11,61	23,33	0,0121
2016-17	7	11,45	11,58	11,52	0,00845	2016-17	7	11,45	11,58	23,03	0,0169
2016-19	8	11,56	11,72	11,64	0,0128	2016-19	8	11,56	11,72	23,28	0,0256
2016-24	9	11,52	11,50	11,51	0,0002	2016-24	9	11,52	11,50	23,02	0,0004
2016-27	10	11,63	11,70	11,67	0,00245	2016-27	10	11,63	11,70	23,33	0,0049
											0,1122
	Mean	11,557		Worst pair	0,0162		Mean	11,557			
	Max	11,72		SUM of SD ²	0,0561		Max	11,72			
	Min	11,28		C	0,2888		Min	11,28			
				Ccr, 5%	0,602						
				Ccr, 1%	0,718	Analytical variance S ² ar		0,0056	SD	0,1217	
				Conclusion		Sanal		0,0749	RSDR	1,0534	
				5% PASS		Ssums		0,0501			
				1% PASS		MSb		0,0251			
						Between sample varian		0,0097			
Remarks											
1. Cohran's C test is described in ISO 5725-2 and FAPAS protocol, sixth edition, 2002											
2. Test for 'sufficient homogeneity' is performed according to FAPAS protocol, sixth edition, 2002											

Source of σp value to use		σp
Use(write '1')	Source	
	C>13.8%, HORWITZ	0,3400
1	120ppb<C<13.8%, HORWITZ	0,3198
	C<120 ppb	0,0337
MASS NEGATIVE POWER FOR HORWITZ EQUATION(%)		2
	SD	0,1217
	Method based SD	
	Target SD chosen	0,3198
	σ^2 all	0,0092
	Replicates	10
	F1	1,88
	F2	1,01
	Critical value	0,0230
	Between sample variance S^2 sam	0,0097
	Sufficient homogeneity test	PASS

3.4.2. Stability

Вміст білка в перерахунку на суху речовину (Nx5.7), %				ISO 20483						
Crude protein content on dry matter (Nx5.7), %				ISO 20483						
Дослідження гомогенності в умовах та термінах зберігання/Homogeneity test for storage conditions and terms - Stability test										
Аналіз викидів за тестом Кохрана(C -test)/Cohran's C test for outliers						Аналіз на 'достатню однорідність'/Test for 'sufficient homogeneity' for storage				
Номер зразку/ Sample number	Результат/ Result A	Результат/ Result B	Average	SD ²	Номер зразку/ Sample number	Результат/ Result A	Результат/ Result B	SUM	Difference ²	
2016-2	1	11,39	11,44	11,42	0,00125	2016-2	1	11,39	11,44	0,0025
2016-6	2	11,55	11,42	11,49	0,00845	2016-6	2	11,55	11,42	0,0169
2016-10	3	11,64	11,66	11,65	0,0002	2016-10	3	11,64	11,66	0,0004
2016-12	4	11,66	11,65	11,66	5E-05	2016-12	4	11,66	11,65	0,0001
2016-15	5	11,28	11,46	11,37	0,0162	2016-15	5	11,28	11,46	0,0324
2016-16	6	11,72	11,61	11,67	0,00605	2016-16	6	11,72	11,61	0,0121
2016-1	7	11,63	11,51	11,57	0,0072	2016-1	7	11,63	11,51	0,0144
2016-1	8	11,64	11,67	11,66	0,00045	2016-1	8	11,64	11,67	0,0009
2016-1	9	11,62	11,73	11,68	0,00605	2016-1	9	11,62	11,73	0,0121
2016-1	10	11,69	11,69	11,69	0	2016-1	10	11,69	11,69	0,0000
										0,0918
Mean	11,583		Worst pair	0,0162	Mean	11,583				
Max	11,73		SUM of SD ²	0,0459	Max	11,73				
Min	11,28		C	0,3529	Min	11,28				
			Ccr, 5%	0,602						
			Ccr, 1%	0,718	Analytical variance S ² a	0,0046	SD	0,1247		
			Conclusion		Sanal	0,0677	RSDR	1,0769		
			5% PASS		Ssums	0,0555				
			1% PASS		MSb	0,0277				
					Between sample variance S ² sam	0,0116				
Remarks										
1. Cohran's C test is described in ISO 5725-2 and FAPAS protocol, sixth edition, 2002										
2. Test for 'sufficient homogeneity' is performed according to FAPAS protocol, sixth edition, 2002										

Source of σ value to use		
Use(write '1')	Source	σ
	C>13.8%, HORWITZ	0,3403
1	120ppb<C<13.8%, HORWITZ	0,3204
	C<120 ppb	0,0340
MASS NEGATIVE POWER FOR HORWITZ EQUATION(%)		2
	SD	0,1247
	Method based SD	
	Target SD chosen	0,3204
	σ^2 all	0,0092
	Replicates	10
	F1	1,88
	F2	1,01
	Critical value	0,0220
	Between sample variance S ² sam	0,0116
	Sufficient homogeneity test for storage conditions and terms-Stability test	PASS

3.4.5. Data for all analytes

Method	EU 742/EN 15587	EU 742/EN 15587	EU 742/EN 15587	EU 742/EN 15587	ISO 20483	ISO 21415-2	ISO 21415-2	ISO 712	ISO 7971-3	ISO 3093	GOST 30483/DS TU 3768	GOST 30483/DS TU 3768	GOST 30483/DS TU 3768	GOST 10846	GOST 13586.1	GOST 13586.1	GOST 13586.5	DSTU 4234	DSTU 27676
	Broken grains, %	Grain impurities, %	Sprouted grains, %	Miscellaneous impurities, %	Protein content, %	Wet gluten content, %	Gluten Index	Moisture content, %	Test weight, kg/hl	Falling number, s	Foreign impurities, %	Grain impurities, %	Grains damaged by Bug, %	Protein content, %	Wet gluten content, %	Index of gluten deformation	Moisture content, %	Test weight, kg/hl	Falling number, s
Homogeneity																			
Cohran's 'C' test																			
Critical value(5%,10pairs)=0,602	0,3465	0,2952	0,2370	0,3504	0,3529	0,2439	0,2257	0,3390	0,2727	0,2625	0,2547	0,4777	0,2024	0,2822	0,3396	0,2000	0,3546	0,5935	0,3899
Mean Result	4,2520	2,4015	0,7640	0,4535	11,5570	22,9855	91,5205	12,5000	80,7650	253,5000	6,5955	0,4225	0,5920	11,4725	20,4600	71,9000	12,2460	80,7680	253,5500
Conclusion	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Analytical variance test																			
S ² anal	0,0148	0,0142	0,0024	0,0021	0,0056	0,0059	0,1418	0,0015	0,0165	76,2000	0,0572	0,0024	0,0025	0,0014	0,0339	4,0000	0,0014	0,0034	28,8500
Sanal	0,1216	0,1194	0,0492	0,0453	0,0749	0,0770	0,3765	0,0384	0,1285	8,7293	0,2392	0,0485	0,0497	0,0379	0,1842	2,0000	0,0375	0,0581	5,3712
S ² sample	0,0967	0,0467	0,0071	0,0028	0,0097	0,0611	1,4105	0,0012	0,0124	58,0667	0,0520	0,0021	0,0045	0,0117	0,0052	4,1000	0,0033	0,0027	61,2667
σ _p	0,7120	0,7200	0,1680	0,0685	0,3198	1,2800	3,6390	0,3420	0,1682	11,2500	0,1986	0,0192	0,2790	0,3178	0,4523	2,8079	0,3360	0,0770	14,9200
σ _p source	Results	Trial SD	Trail SD	Results	Horwitz	Trial SD	Trial SD	Horwitz	Results	Trial SD	Horwitz	Horwitz	Trial SD	Horwitz	Horwitz	Results	Horwitz	Results	Trial SD
σ ² all	0,0456	0,0467	0,0025	0,0004	0,0092	0,1475	1,1918	0,0105	0,0025	11,3906	0,0035	0,00003	0,0070	0,0091	0,0184	0,7096	0,0102	0,0005	20,0346
Critical value	0,1007	0,1021	0,0072	0,0029	0,0230	0,2832	2,3838	0,0213	0,0215	98,3764	0,0645	0,0024	0,0157	0,0185	0,0689	5,3740	0,0205	0,0044	66,8035
Conclusion	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Stability																			
Cohran's 'C' test																			
Critical value(5%,10pairs)=0,602	0,2949	0,3072	0,4013	0,2774	0,3529	0,2896	0,2686	0,341772	0,3460	0,3376	0,2737	0,3556	0,2459	0,4800	0,2813	0,2462	0,4707	0,5215	0,3414
Mean Result	4,1940	2,3150	0,7210	0,4610	11,5830	22,9885	91,869	12,5470	80,7905	249,65	6,5390	0,4430	0,5770	11,4810	20,5640	72,0500	12,2780	80,7705	256,1500
Conclusion	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Analytical variance test																			
S ² anal	0,0098	0,0137	0,0033	0,0015	0,0046	0,0076	0,0886	0,0012	0,0130	59,2500	0,0387	0,0036	0,0025	0,0015	0,0410	3,2500	0,0024	0,0038	32,9500
Sanal	0,0989	0,1170	0,0571	0,0382	0,0677	0,0873	0,2977	0,0344	0,1140	7,6974	0,1966	0,0600	0,0496	0,0387	0,2024	1,8028	0,0489	0,0619	5,7402
S ² sample	0,0954	0,0253	0,0079	0,0030	0,0116	0,0845	1,4479	0,0022	0,0008	80,9333	0,0274	0,0013	0,0031	0,0085	0,0031	4,0667	0,0038	0,0019	62,4722
σ _p	0,7200	0,7200	0,1680	0,1382	0,3204	1,2800	3,6390	0,3429	0,1174	11,4600	0,1972	0,0200	0,2790	0,3178	0,4535	2,6651	0,3367	0,0753	14,9200
σ _p source	Results	Trial SD	Trail SD	Trial SD	Horwitz	Trial SD	Trial SD	Horwitz	Results	Trial SD	Horwitz	Horwitz		Horwitz	Horwitz	Results	Horwitz	Results	Trial SD
σ ² all	0,0467	0,0467	0,0025	0,0017	0,0092	0,1475	1,1918	0,0106	0,0012	11,3906	0,0035	0,00004	0,0070	0,0091	0,0185	0,6392	0,0102	0,0005	20,0346
Critical value	0,0976	0,1015	0,0081	0,0047	0,0220	0,2849	2,3301	0,0211	0,0155	81,2569	0,0456	0,0037	0,0157	0,0186	0,0762	4,4843	0,0216	0,0048	70,9445
Conclusion	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

4. DATA SUMMARY

Method	EU 742/EN 15587	EU 742/EN 15587	EU 742/EN 15587	EU 742/EN 15587	ISO 20483	Express - infrared spectroscopy method, calibrated to ISO 20483	ISO 21415-2	ISO 21415-2	ISO 712	Express - infrared spectroscopy method, calibrated to ISO 712	ISO 7971-3	ISO 3093	GOST 30483/DS TU 3768	GOST 30483/DS TU 3768	GOST 30483/DS TU 3768	GOST 10846	Express - infrared spectroscopy method, calibrated to GOST 10846	GOST 13586.1	GOST 13586.1	GOST 13586.5	Express - infrared spectroscopy method, calibrated to GOST 13586.5	DSTU 4234	DSTU 27676
	Broken grains, %	Grain impurities, %	Sprouted grains, %	Miscellaneous impurities, %	Protein content, %	Protein content, %	Wet gluten content, %	Gluten Index	Moisture content, %	Moisture content, %	Test weight, kg/hl	Falling number, s	Foreign impurities, %	Grain impurities, %	Grains damaged by Bug, %	Protein content, %	Protein content, %	Wet gluten content, %	Index of gluten deformation	Moisture content, %	Moisture content, %	Test weight, kg/hl	Falling number, s
No of Results	10	10	10	9	7	8	9	9	10	6	10	10	11	12	12	10	6	11	11	13	6	12	11
Mean	4,157	2,778	0,564	0,510	11,619	11,489	21,514	93,049	12,460	12,367	80,269	266,000	0,419	7,093	0,860	11,427	11,425	20,413	74,636	12,142	12,217	80,108	269,455
Min	3,750	2,000	0,380	0,360	11,490	11,200	20,000	87,700	12,300	12,150	79,600	252,000	0,200	5,800	0,450	11,240	11,200	18,100	63,000	11,770	11,900	78,700	251,000
Max	4,500	3,720	0,840	0,800	11,700	11,700	23,100	98,000	12,650	12,500	80,800	282,000	0,800	13,700	1,440	11,670	11,650	22,800	89,000	12,400	12,500	80,800	297,000
SD	0,2278	0,7213	0,1680	0,1577	0,0776	0,1707	1,2871	3,6391	0,1033	0,1350	0,4097	11,2546	0,1643	2,1248	0,3067	0,1439	0,1810	1,3576	8,8885	0,1748	0,2483	0,6037	14,9222
Median	4,215	2,55	0,515	0,42	11,65	11,505	22,14	93	12,465	12,375	80,3	265,5	0,44	6,655	0,81	11,445	11,425	20,44	71,5	12,14	12,2	80,25	268
Robust mean	4,165	2,778	0,560	0,500	11,622	11,496	21,514	93,049	12,456	12,373	80,278	266,000	0,406	6,561	0,845	11,423	11,425	20,404	74,383	12,148	12,217	80,186	267,558
Robust SD	0,2022	0,7213	0,1614	0,1382	0,0707	0,1569	1,2871	3,6391	0,0874	0,1237	0,3948	11,2546	0,1055	0,4870	0,2796	0,1363	0,1810	1,1603	8,4588	0,1376	0,2483	0,4427	11,4612
Target SD	0,220	0,720	0,160	0,158	0,320	0,320	1,280	3,639	0,342	0,342	0,395	11,256	0,210	0,487	0,307	0,320	0,320	1,350	8,459	0,342	0,342	0,604	14,920
Source of target SD	Trial SD	Trial SD	Trial SD	Trial SD	Horwitz	Horwitz	Trial SD	Trial SD	Horwitz	Horwitz	Trial SD	Trial SD	Trial SD	Trial SD	Trial SD	Horwitz	Horwitz	Trial SD	Trial SD	Horwitz	Horwitz	Trial SD	Trial SD
No of failed z-Scores	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
% of failed z-Scores	0	0	0	0	0	0	0	0	0	0	0	0	0	8,33	0	0	0	0	0	0	0	8,33	0
Assigned value for sample	4,165	2,778	0,560	0,500	11,622	11,496	21,514	93,049	12,456	12,373	80,278	266,000	0,406	6,561	0,845	11,423	11,425	20,404	74,383	12,148	12,217	80,186	267,558
SD - Assigned value	0,202	0,721	0,161	0,138	0,071	0,157	1,287	3,639	0,087	0,124	0,395	11,255	0,105	0,487	0,280	0,136	0,181	1,160	8,459	0,138	0,248	0,443	11,461
RSD(CV), % - Assigned	4,85	25,97	28,82	27,66	0,61	1,36	5,98	3,91	0,70	1,00	0,49	4,23	26,00	7,42	33,07	1,19	1,58	5,69	11,37	1,13	2,03	0,55	4,28
u of the assigned value	0,064	0,228	0,051	0,046	0,027	0,055	0,429	1,213	0,028	0,050	0,125	3,559	0,032	0,147	0,081	0,043	0,074	0,350	2,550	0,038	0,101	0,133	3,456
u,% of the assigned value	1,54	8,21	9,11	9,22	0,23	0,48	1,99	1,30	0,22	0,41	0,16	1,34	7,84	2,24	9,55	0,38	0,65	1,71	3,43	0,31	0,83	0,17	1,29

5. RAW DATA

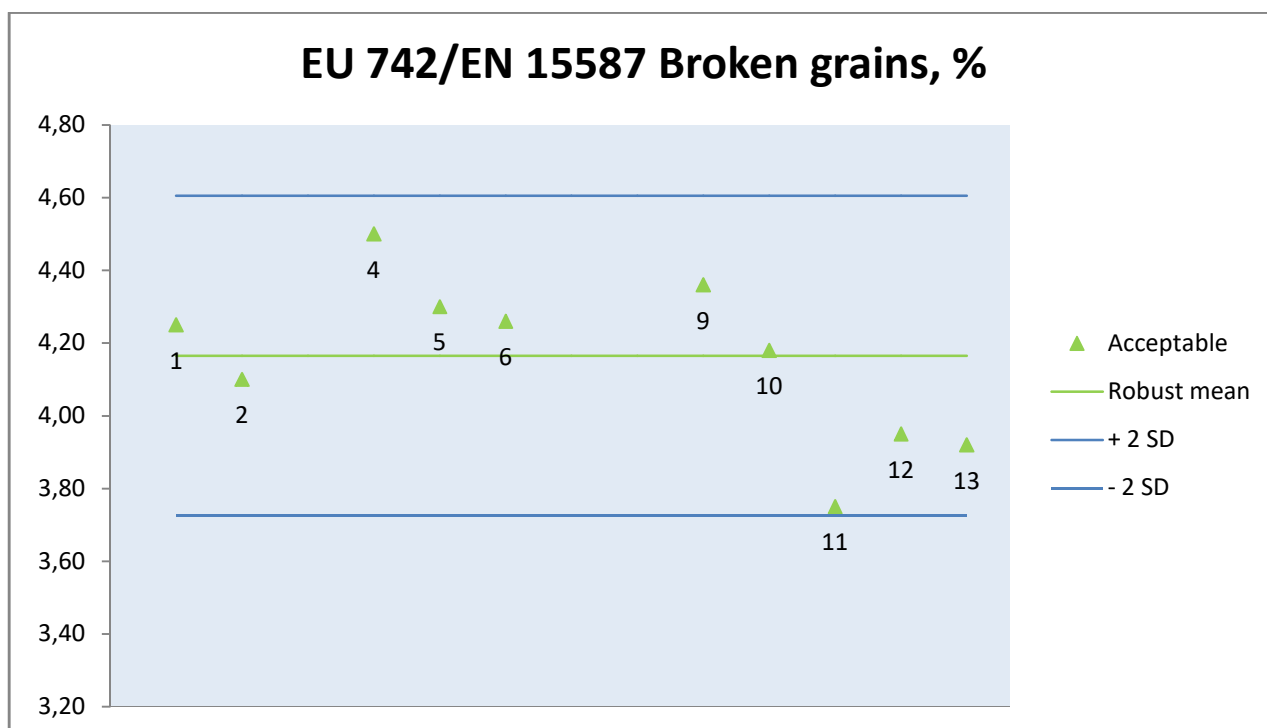
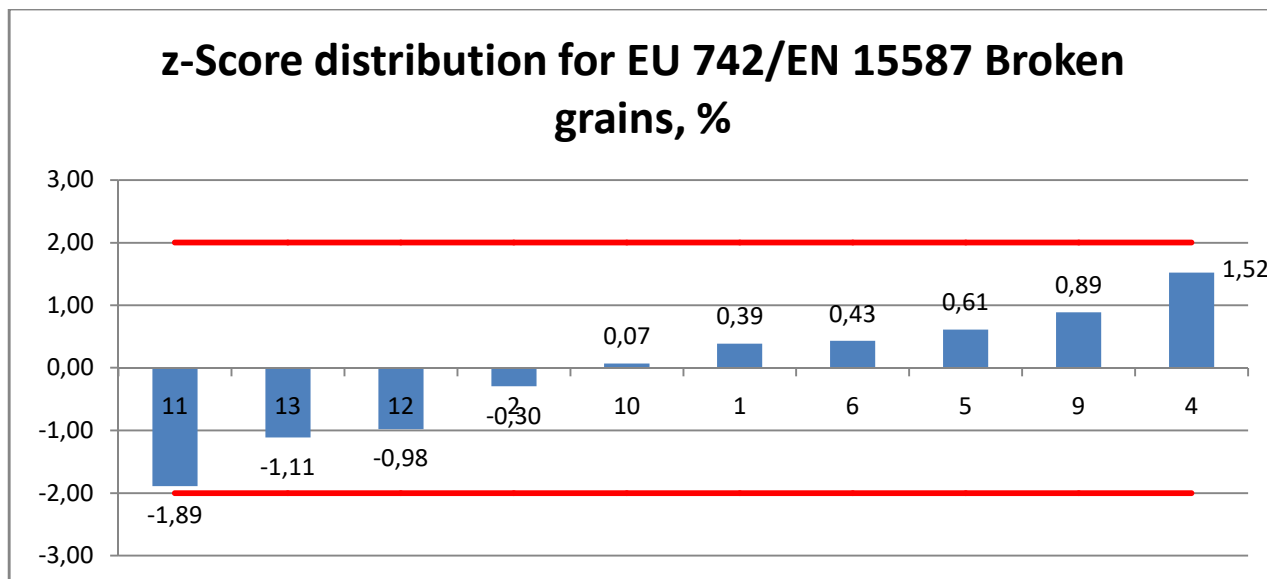
Method	EU 742/EN 15587	EU 742/EN 15587	EU 742/EN 15587	EU 742/EN 15587	ISO 20483	Express - infrared spectroscopy method, calibrated to ISO 20483	ISO 21415-2	ISO 21415-2	ISO 712	Express - infrared spectroscopy method, calibrated to ISO 712	ISO 7971-3	ISO 3093	GOST 30483/DS TU 3768	GOST 30483/DS TU 3768	GOST 30483/DS TU 3768	GOST 10846	Express - infrared spectroscopy method, calibrated to GOST 10846	GOST 13586.1	GOST 13586.1	GOST 13586.5	Express - infrared spectroscopy method, calibrated to GOST 13586.5	DSTU 4234	DSTU 27676
Laboratory Number	Broken grains, %	Grain impurities, %	Sprouted grains, %	Miscellaneous impurities, %	Protein content, %	Protein content, %	Wet gluten content, %	Gluten Index	Moisture content, %	Moisture content, %	Test weight, kg/hl	Falling number, s	Foreign impurities, %	Grain impurities, %	Grains damaged by Bug, %	Protein content, %	Protein content, %	Wet gluten content, %	Index of gluten deformation	Moisture content, %	Moisture content, %	Test weight, kg/hl	Falling number, s
1	4,25	2,23	0,8	0,47	11,64		22,43	92,84	12,56		80,79	253	0,44	6,21	0,45	11,57		20,44	67	12,25		80,8	256
2	4,1	2,16	0,58	0,36	11,7				12,52		80	281	0,44	6,02	0,87	11,25		20,8	70	12,05		80,1	270
3							20,00	98,00					0,38	6,84	1,15	11,51	11,60	20,00	80,00	12,40	12,50	79,40	297
4	4,5	3,2	0,4	0,41		11,2	20,2	93	12,3		79,6	260	0,2	5,8	1,2		11,2	19,1	80	12	12,2	79,6	266
5	4,3	2,26	0,47	0,42	11,65	11,7	20,32	97	12,48		80,3	282	0,33	6,08	0,75	11,34	11,25	20,8	71,5	12,05	11,9	80,3	272
6	4,26	2,06	0,42	0,4	11,65	11,6	20,24	96	12,4	12,3	79,7	274	0,36	6,14	0,64	11,4	11,45	20,4	70	12,1	12	80,2	268
7													0,2	13,7	0,5	11,24		21	77,5	12		78,7	
8																11,3				12,2			
9	4,36	2	0,38	0,4		11,3	22,14	87,8	12,65	12,5	80,3	273	0,46	6,65	0,75		11,4	22,8	89	12,4	12,5	80,1	294
10	4,18	2,84	0,84		11,53	11,45	23,1	87,7	12,35	12,15	80,8	254		7,03	0,57	11,5		22,1	88	11,77		80,7	251
11	3,75	3,61	0,55	0,8		11,5			12,49	12,5	80,2	265	0,8	6,96	0,95					12,27		80,4	272
12	3,95	3,72	0,72	0,68	11,67	11,65	22,4	92,1	12,45	12,33	80,5	266	0,51	7,02	1,05	11,67	11,65	18,1	63	12,14	12,2	80,5	266
13	3,92	3,7	0,48	0,65	11,49	11,51	22,8	93	12,4	12,42	80,5	252	0,49	6,66	1,44	11,49		19	65	12,21		80,5	252

6. Z SCORES

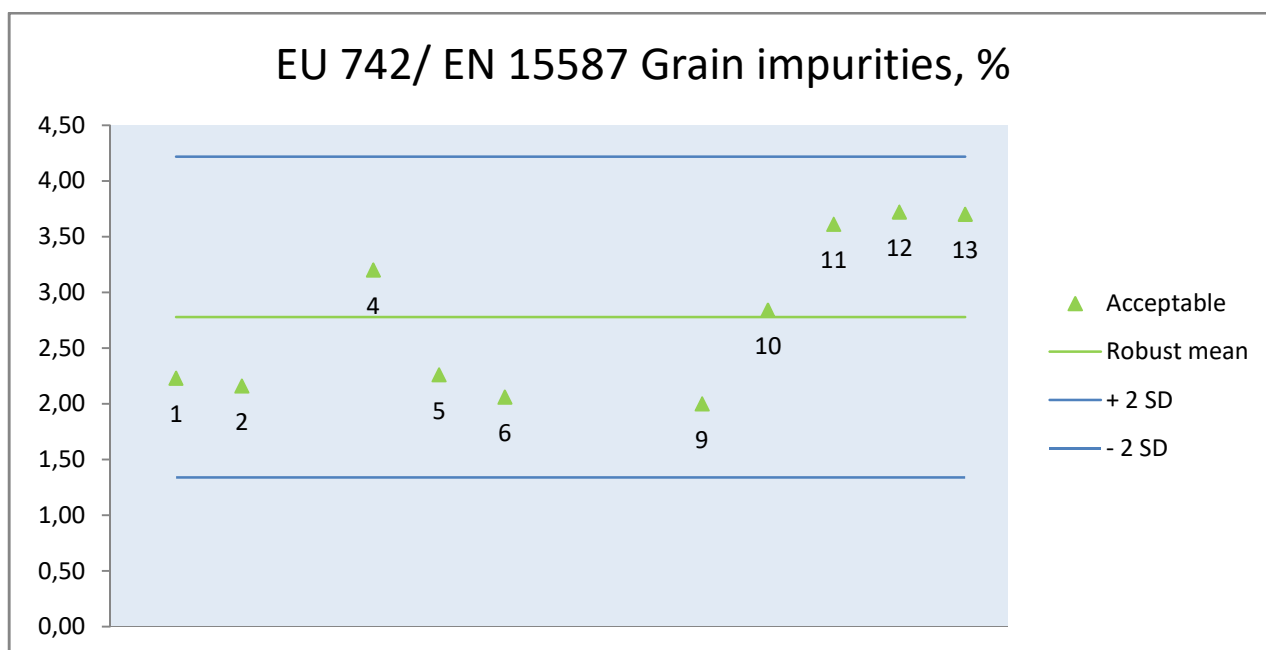
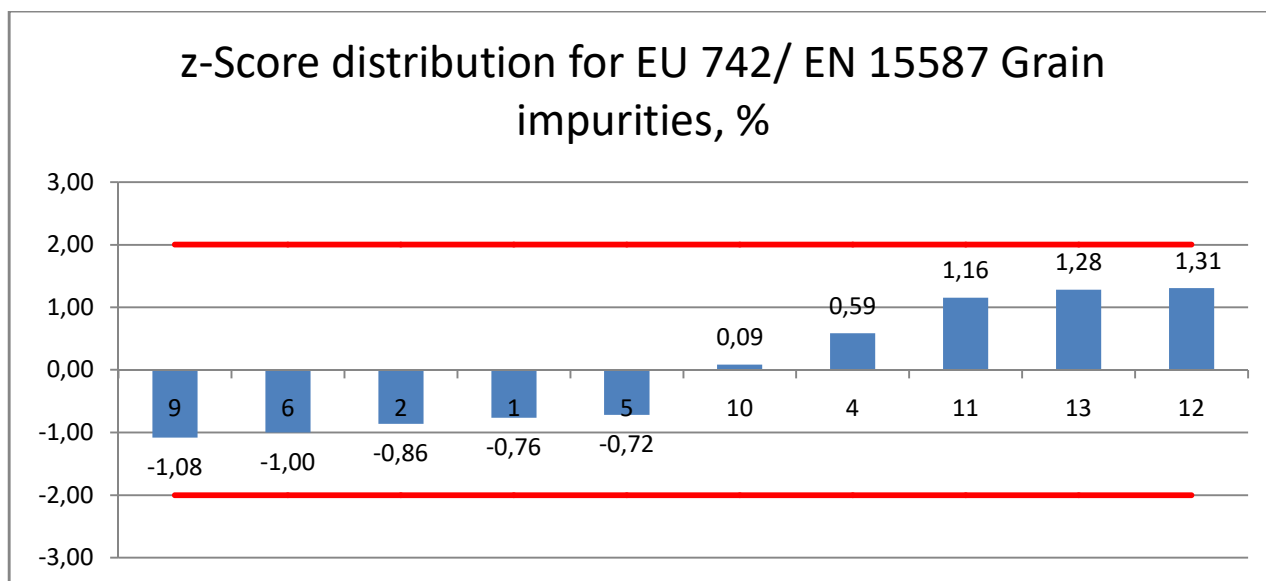
Method	EU 742/EN 15587	EU 742/EN 15587	EU 742/EN 15587	EU 742/EN 15587	ISO 20483	Express - infrared spectroscopy method, calibrated to ISO 20483	ISO 21415-2	ISO 21415-2	ISO 712	Express - infrared spectroscopy method, calibrated to ISO 712	ISO 7971-3	ISO 3093	GOST 30483/DS TU 3768	GOST 30483/DS TU 3768	GOST 30483/DS TU 3768	GOST 10846	Express - infrared spectroscopy method, calibrated to GOST 10846	GOST 13586.1	GOST 13586.1	GOST 13586.5	Express - infrared spectroscopy method, calibrated to GOST 13586.5	DSTU 4234	DSTU 27676
Laboratory Number	Broken grains, %	Grain impurities, %	Sprouted grains, %	Miscellaneous impurities, %	Protein content, %	Protein content, %	Wet gluten content, %	Gluten Index	Moisture content, %	Moisture content, %	Test weight, kg/hl	Falling number, s	Foreign impurities, %	Grain impurities, %	Grains damaged by Bug, %	Protein content, %	Protein content, %	Wet gluten content, %	Index of gluten deformation	Moisture content, %	Moisture content, %	Test weight, kg/hl	Falling number, s
1	0,39	-0,76	1,50	-0,19	0,06		0,72	-0,06	0,30		1,30	-1,15	0,16	-0,72	-1,29	0,46		0,03	-0,87	0,30		1,02	-0,77
2	-0,30	-0,86	0,12	-0,88	0,24				0,19		-0,70	1,33	0,16	-1,11	0,08	-0,54		0,29	-0,52	-0,29		-0,14	0,16
3							-1,18	1,36					-0,12	0,57	0,99	0,27	0,55	-0,30	0,66	0,74	0,83	-1,30	1,97
4	1,52	0,59	-1,00	-0,57		-0,93	-1,03	-0,01	-0,46		-1,72	-0,53	-0,98	-1,56	1,16		-0,70	-0,97	0,66	-0,43	-0,05	-0,97	-0,10
5	0,61	-0,72	-0,56	-0,50	0,09	0,64	-0,93	1,09	0,07		0,06	1,42	-0,36	-0,99	-0,31	-0,26	-0,55	0,29	-0,34	-0,29	-0,93	0,19	0,30
6	0,43	-1,00	-0,88	-0,63	0,09	0,32	-1,00	0,81	-0,16	-0,21	-1,46	0,71	-0,22	-0,87	-0,67	-0,07	0,08	0,00	-0,52	-0,14	-0,63	0,02	0,03
7													-0,98	14,66	-1,13	-0,57		0,44	0,37	-0,43		-2,46	
8																-0,38				0,15			
9	0,89	-1,08	-1,13	-0,63		-0,61	0,49	-1,44	0,57	0,37	0,06	0,62	0,26	0,18	-0,31		-0,08	1,77	1,73	0,74	0,83	-0,14	1,77
10	0,07	0,09	1,75		-0,29	-0,14	1,24	-1,47	-0,31	-0,65	1,32	-1,07		0,96	-0,90	0,24		1,26	1,61	-1,10		0,85	-1,11
11	-1,89	1,16	-0,06	1,90		0,01			0,10	0,37	-0,20	-0,09	1,88	0,82	0,34					0,36		0,35	0,30
12	-0,98	1,31	1,00	1,14	0,15	0,48	0,69	-0,26	-0,02	-0,12	0,56	0,00	0,50	0,94	0,67	0,77	0,70	-1,71	-1,35	-0,02	-0,05	0,52	-0,10
13	-1,11	1,28	-0,50	0,95	-0,41	0,04	1,00	-0,01	-0,16	0,14	0,56	-1,24	0,40	0,20	1,94	0,21		-1,04	-1,11	0,18		0,52	-1,04

7. Z SCORE PLOTS AND RESULTS CHARTS.

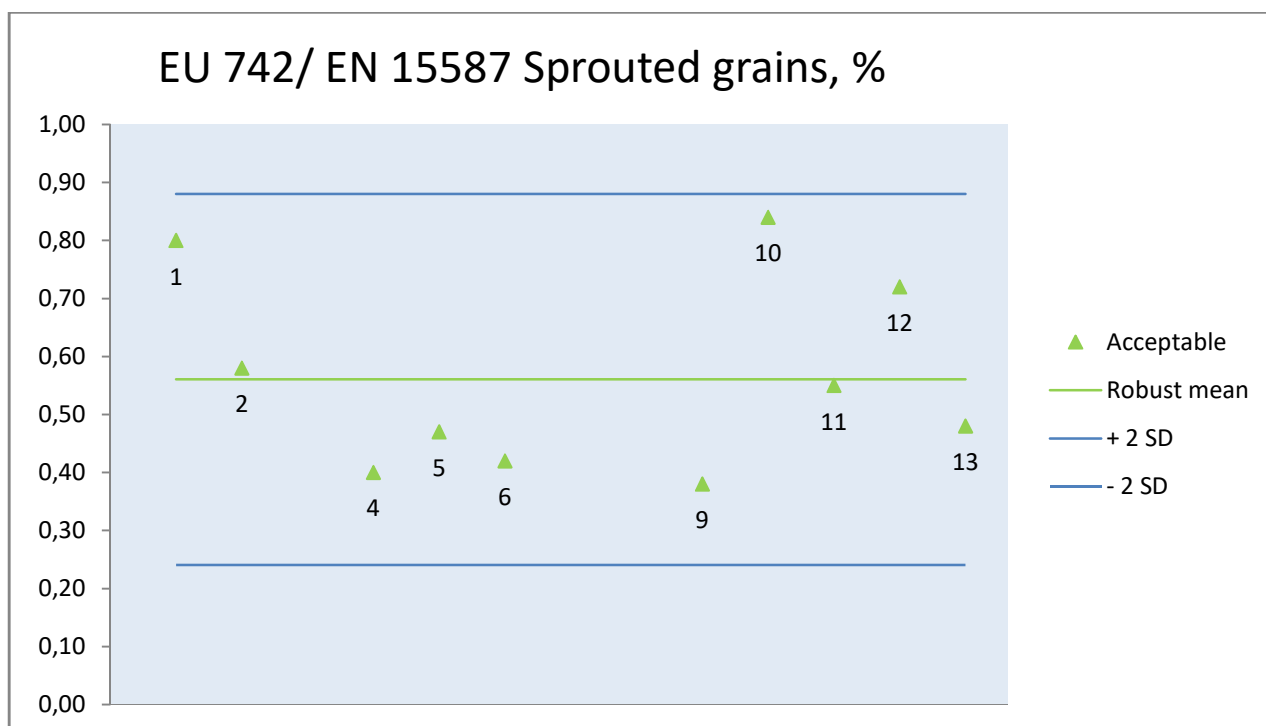
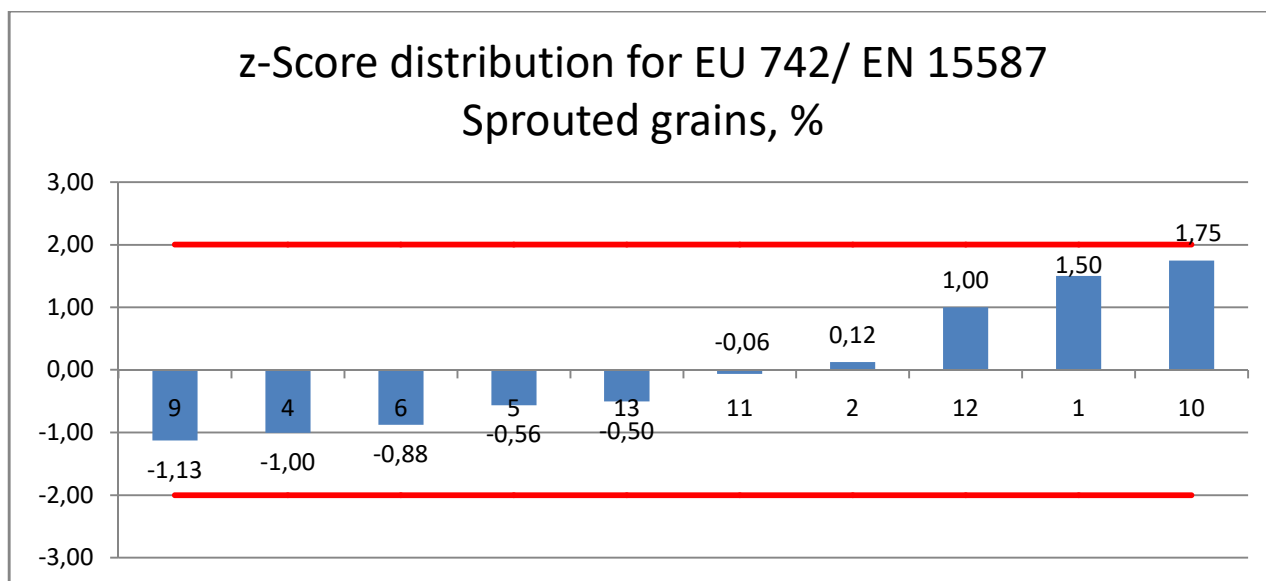
7.1. EU 742/EN 15587 Broken grains, %



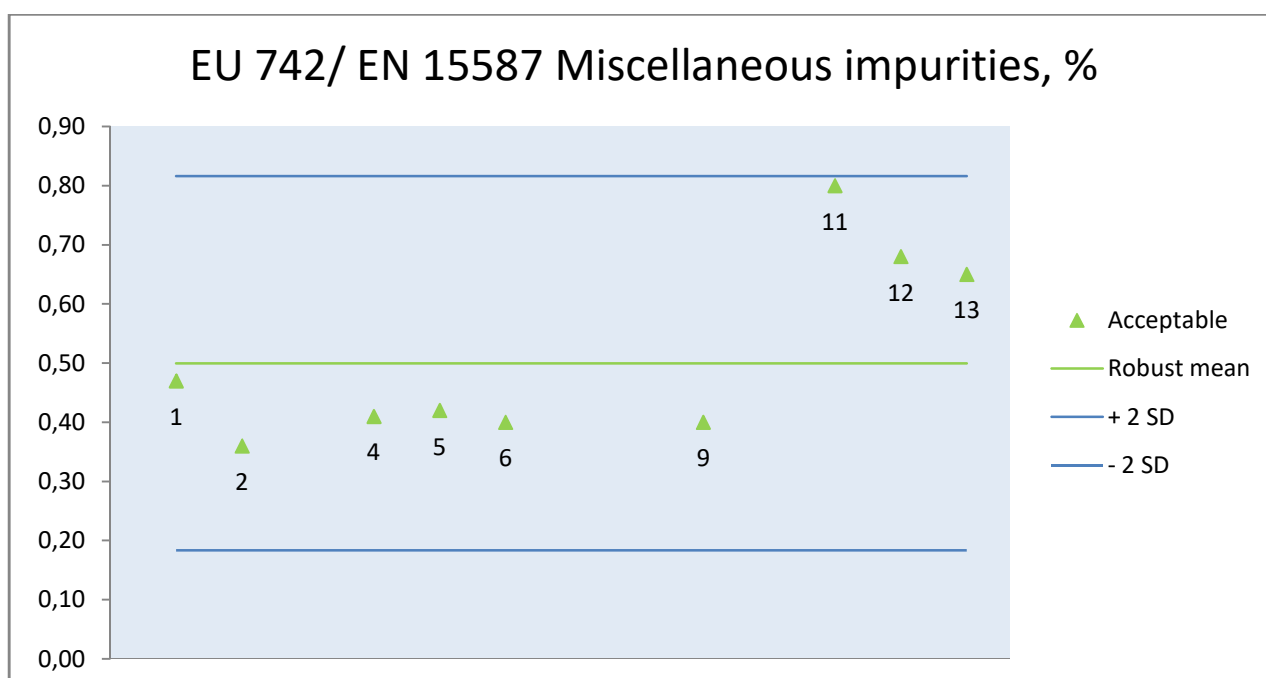
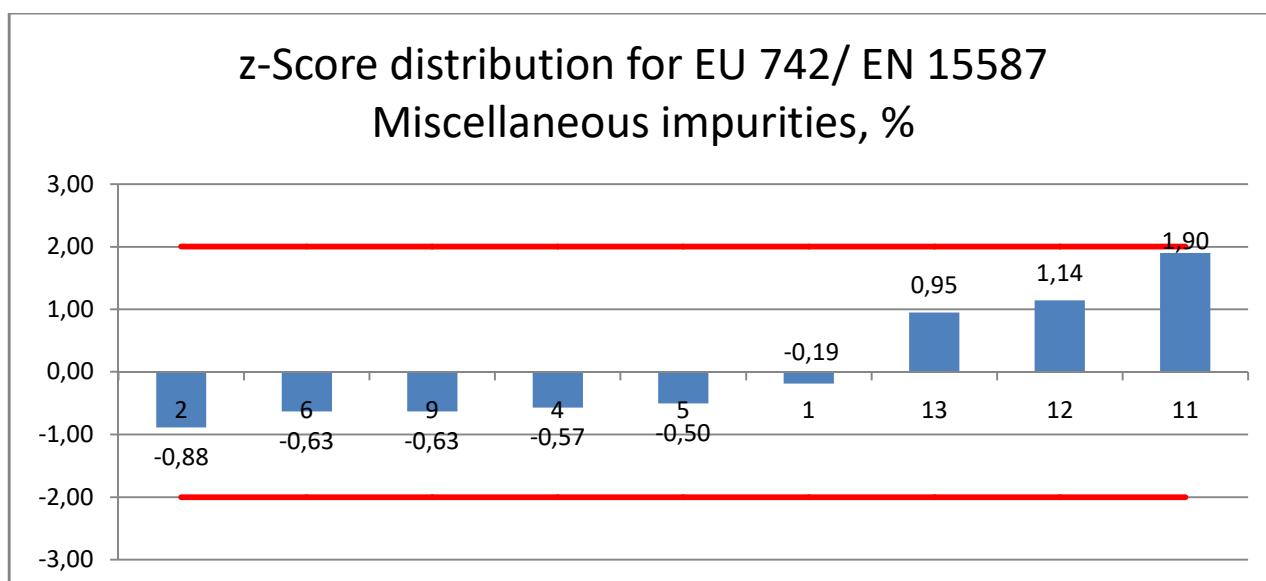
7.2. EU 742/EN 15587 Grain impurities, %



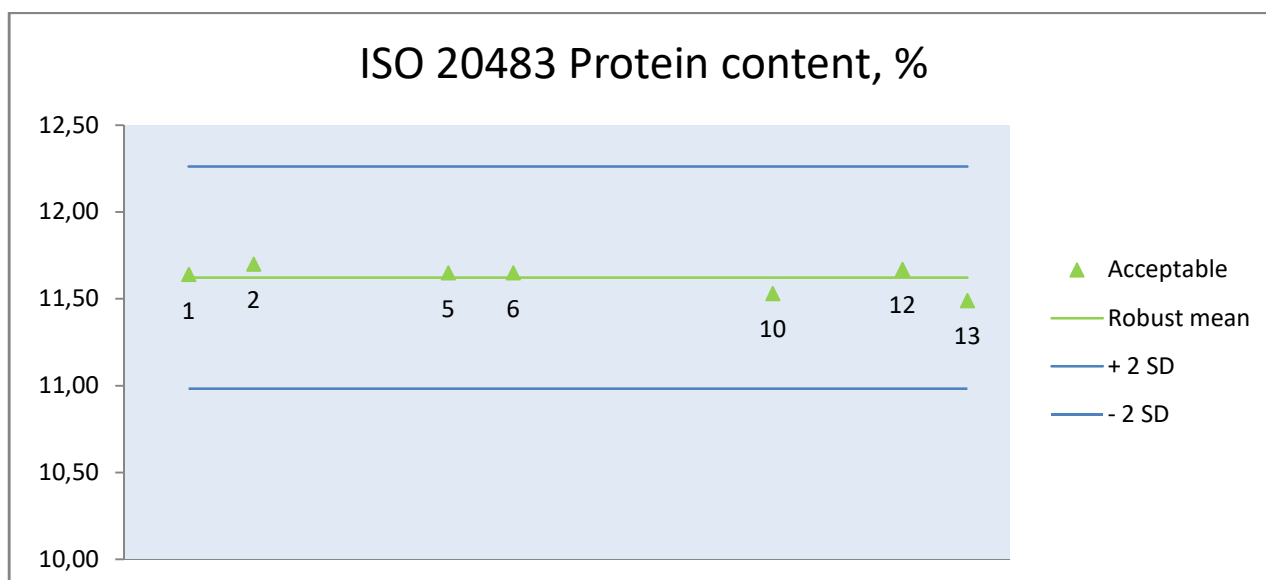
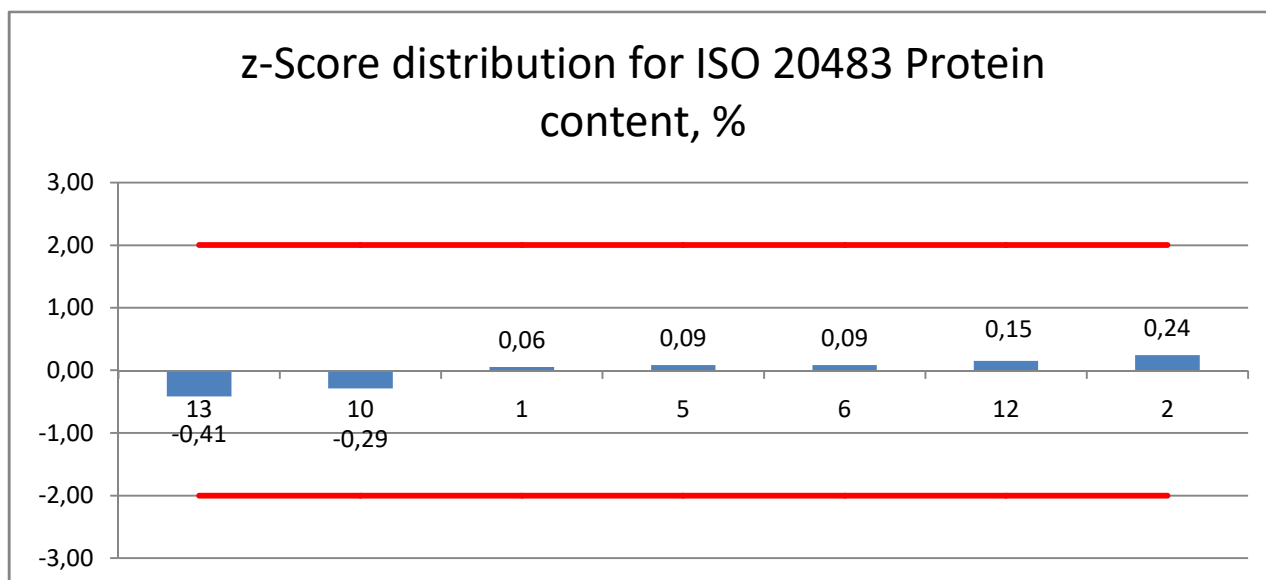
7.3. EU 742/EN 15587 Sprouted grains, %



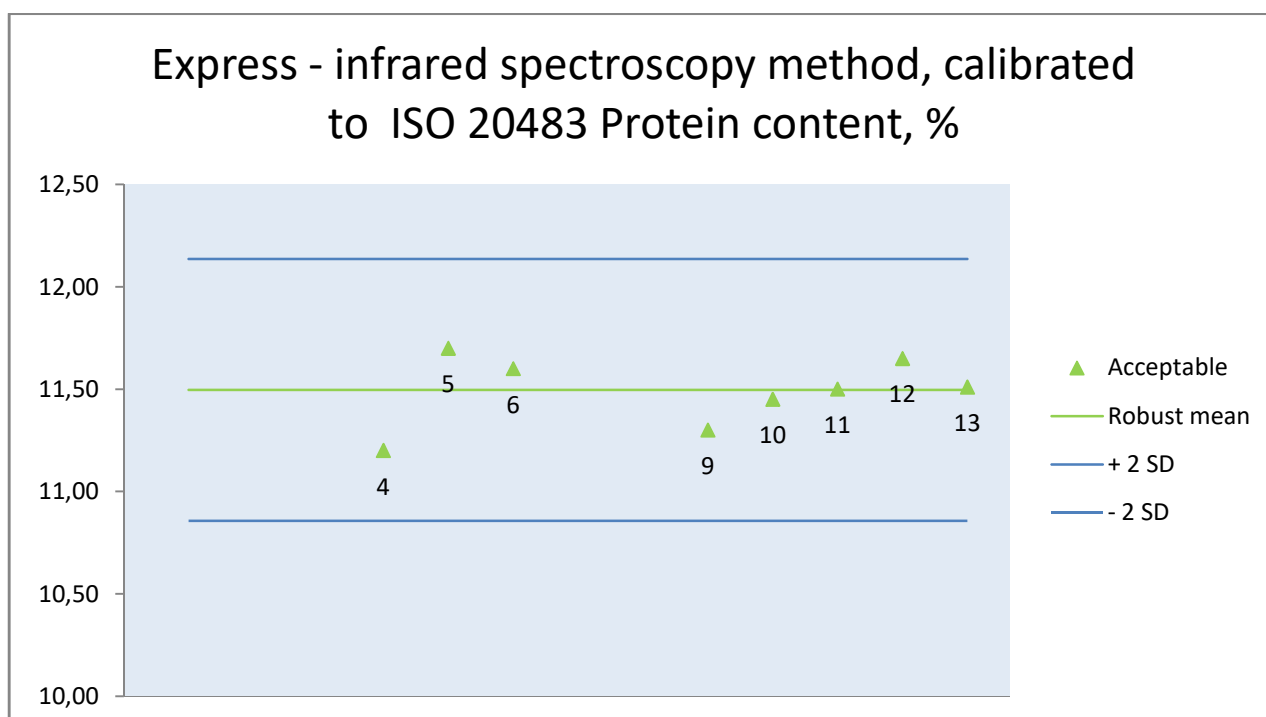
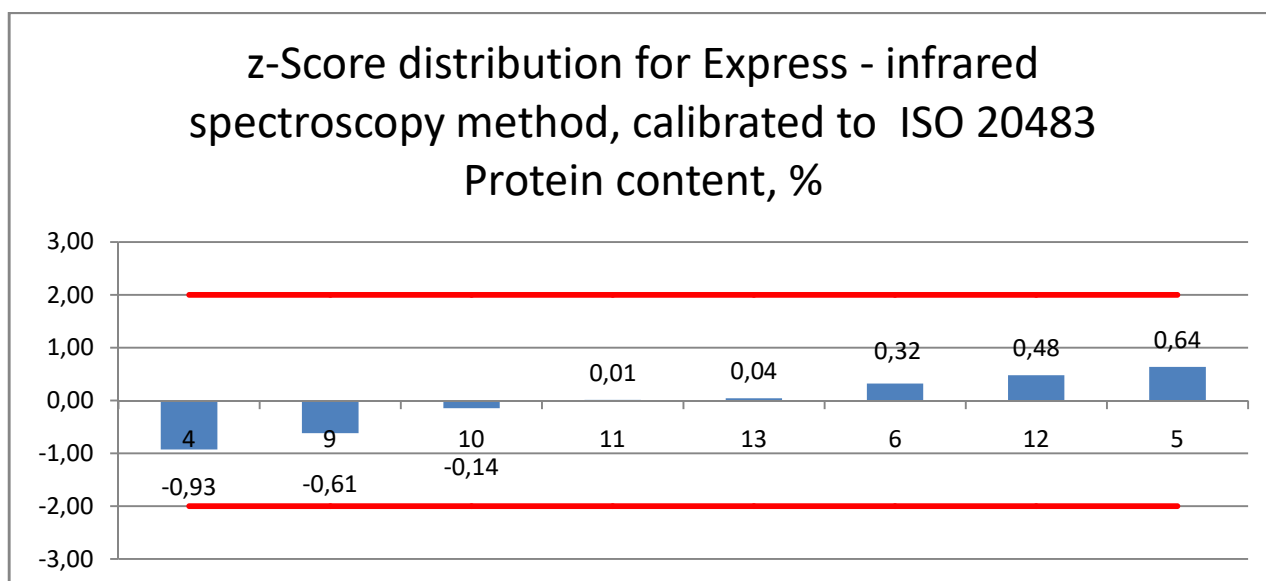
7.4. EU 742/EN 15587 Miscellaneous impurities, %



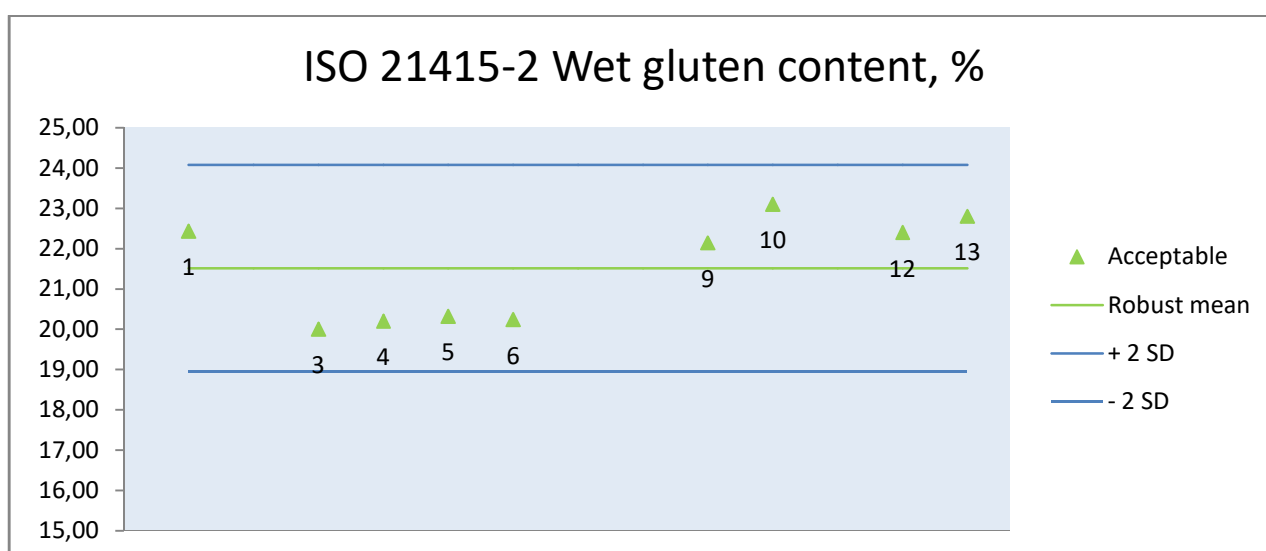
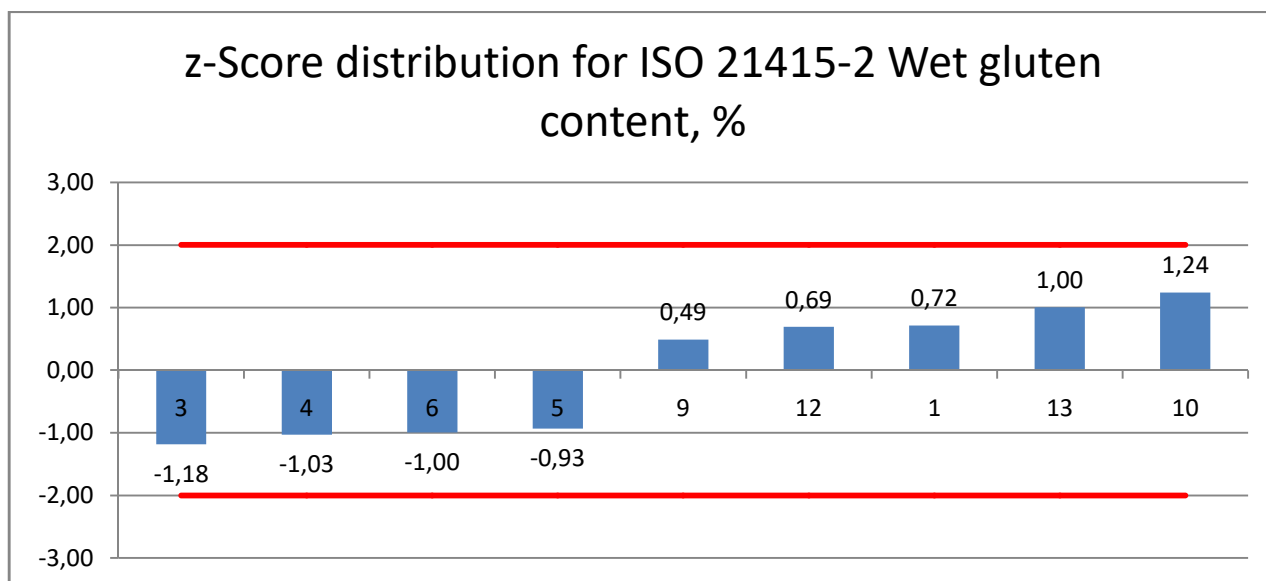
7.5. ISO 20483 Protein content, %



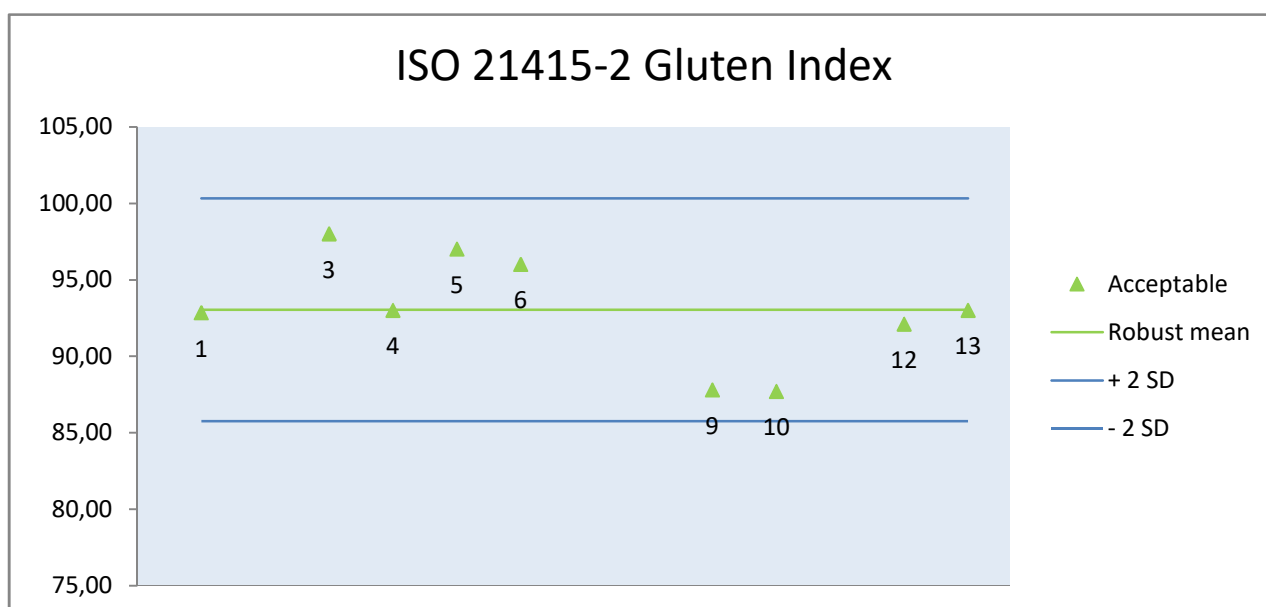
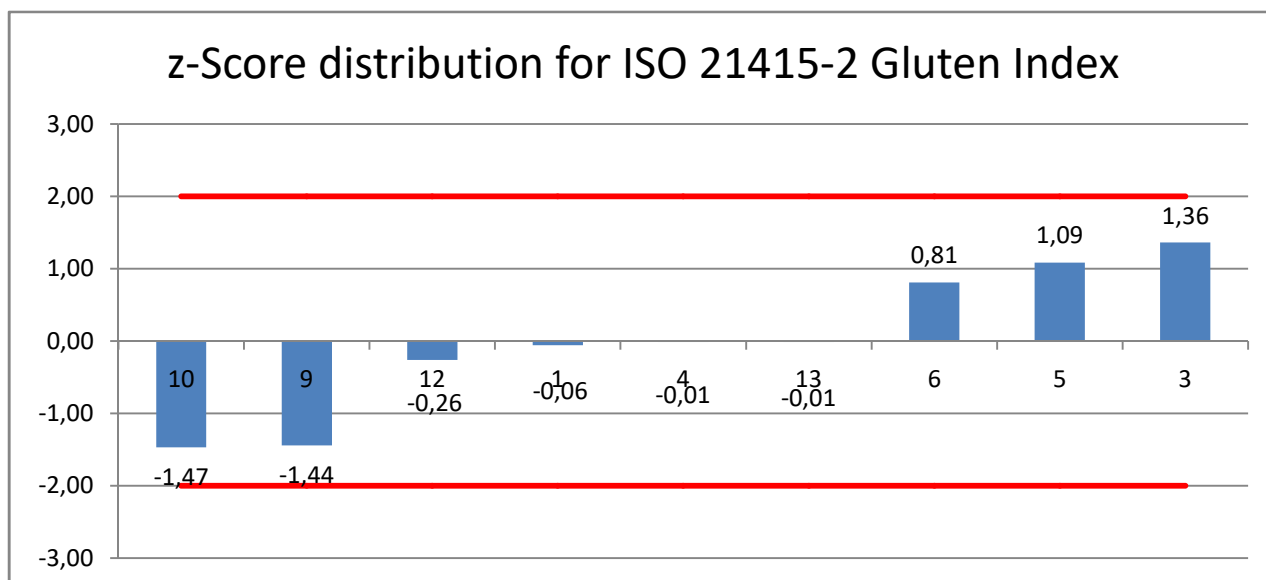
7.6. Express - infrared spectroscopy method, calibrated to ISO 20483 Protein content, %



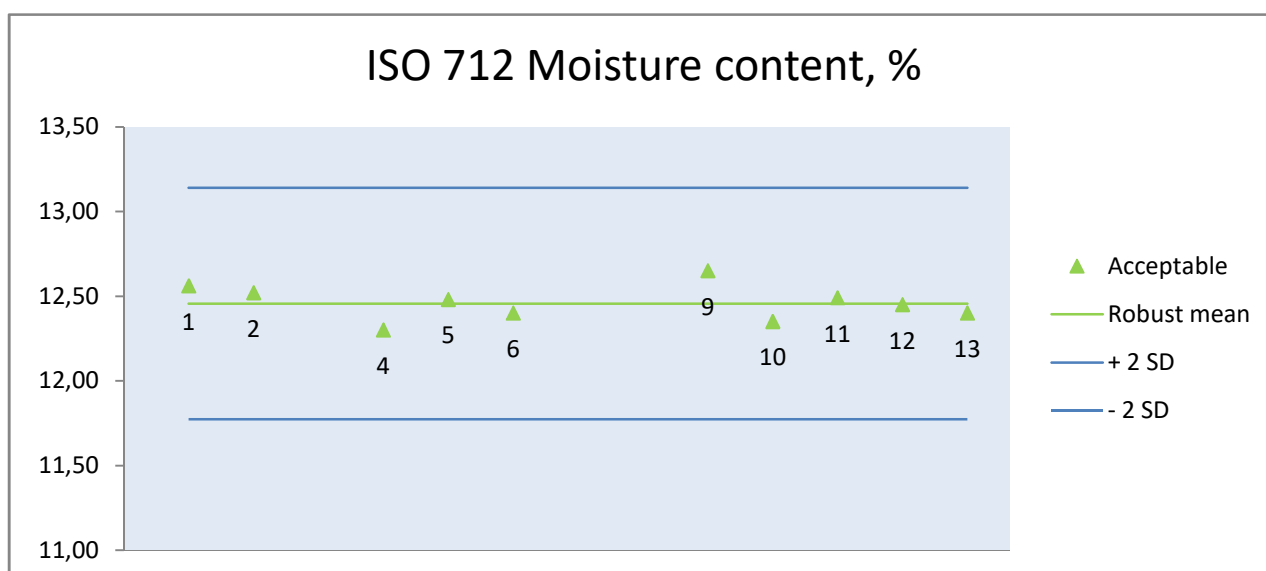
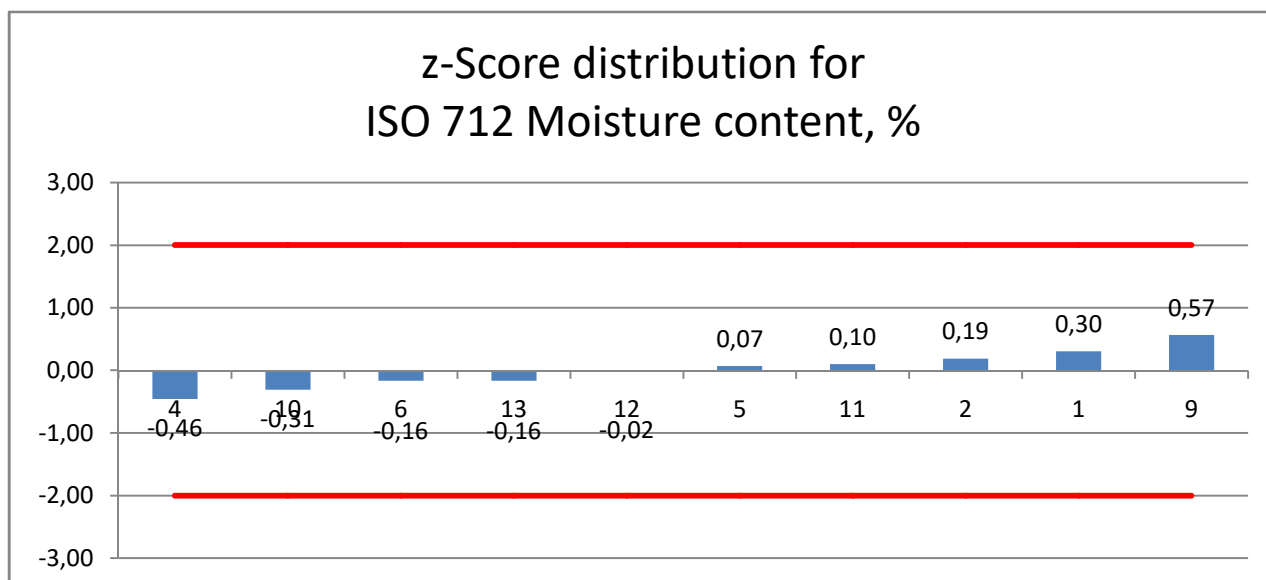
7.7. ISO 21415-2 Wet gluten content, %



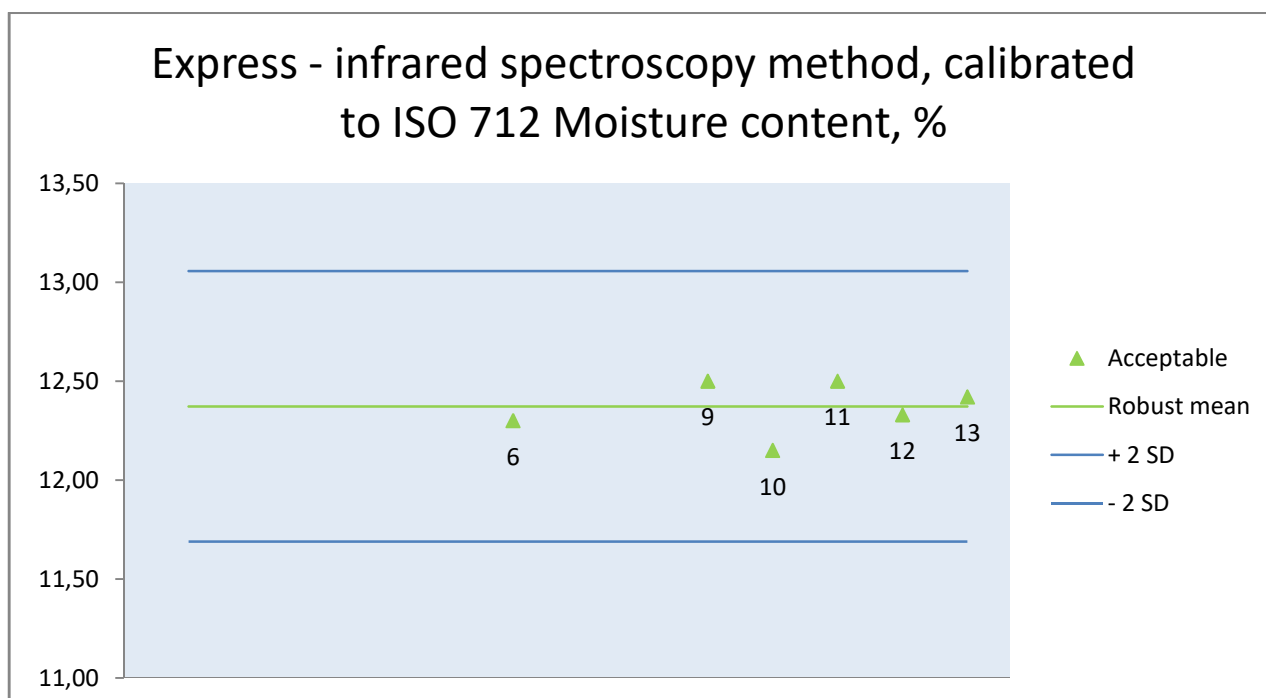
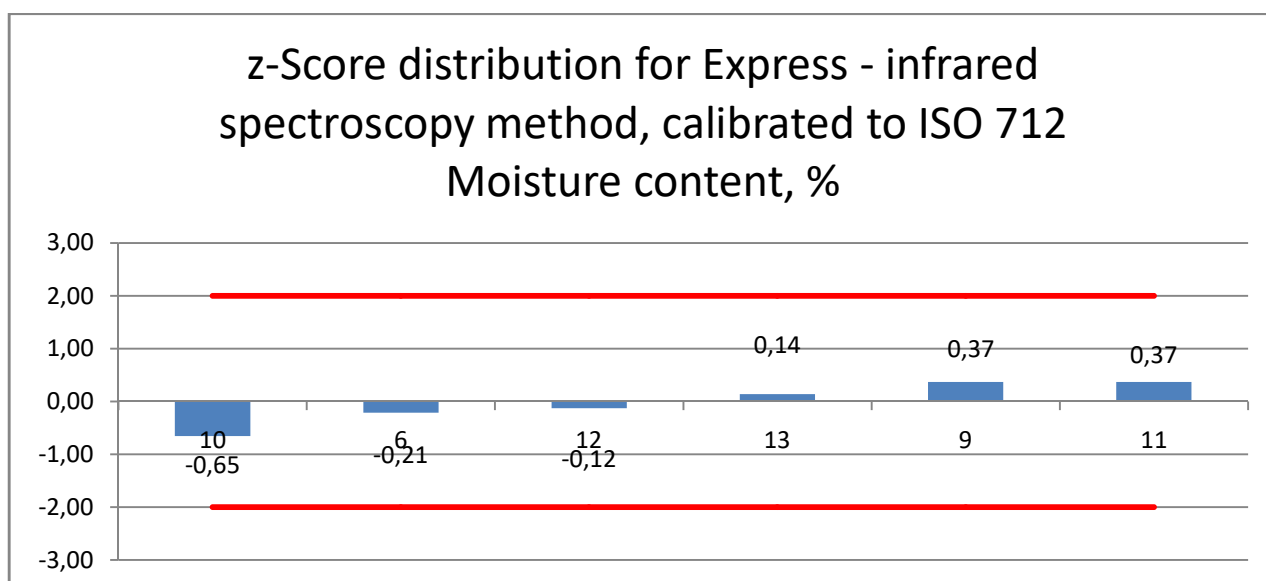
7.8. ISO 21415-2 Gluten Index



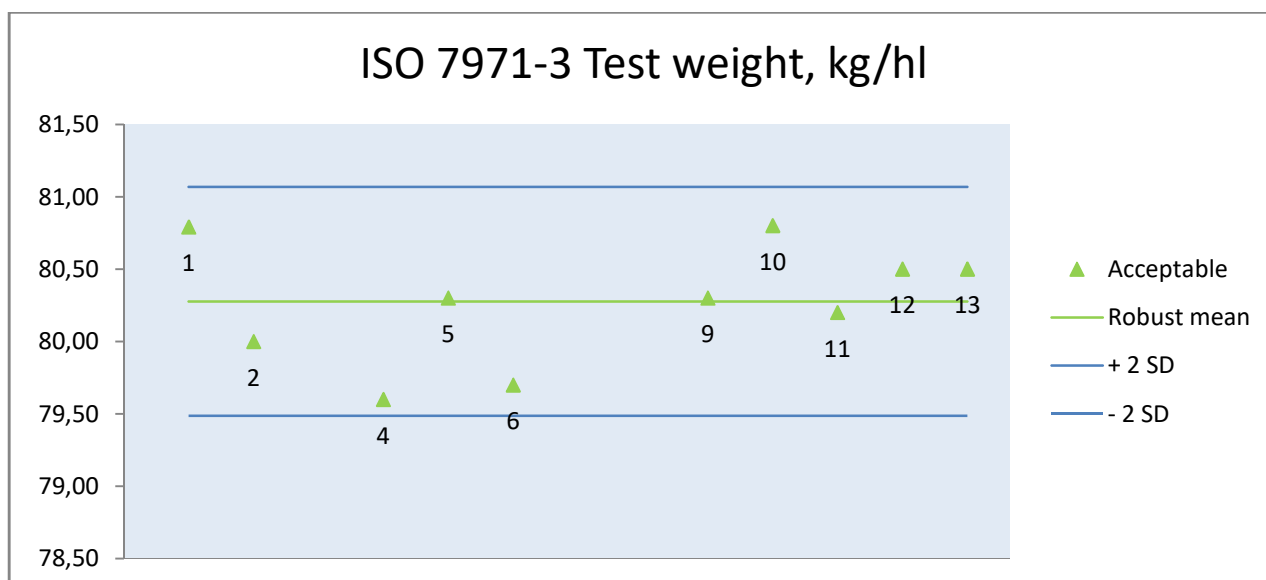
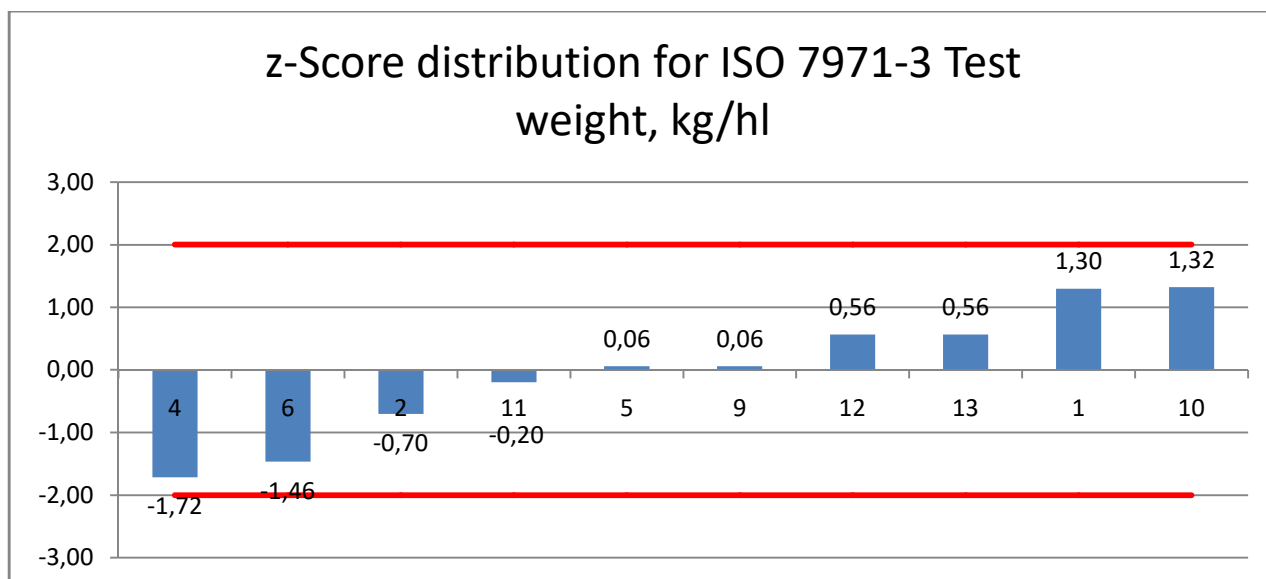
7.9. ISO 712 Moisture content, %



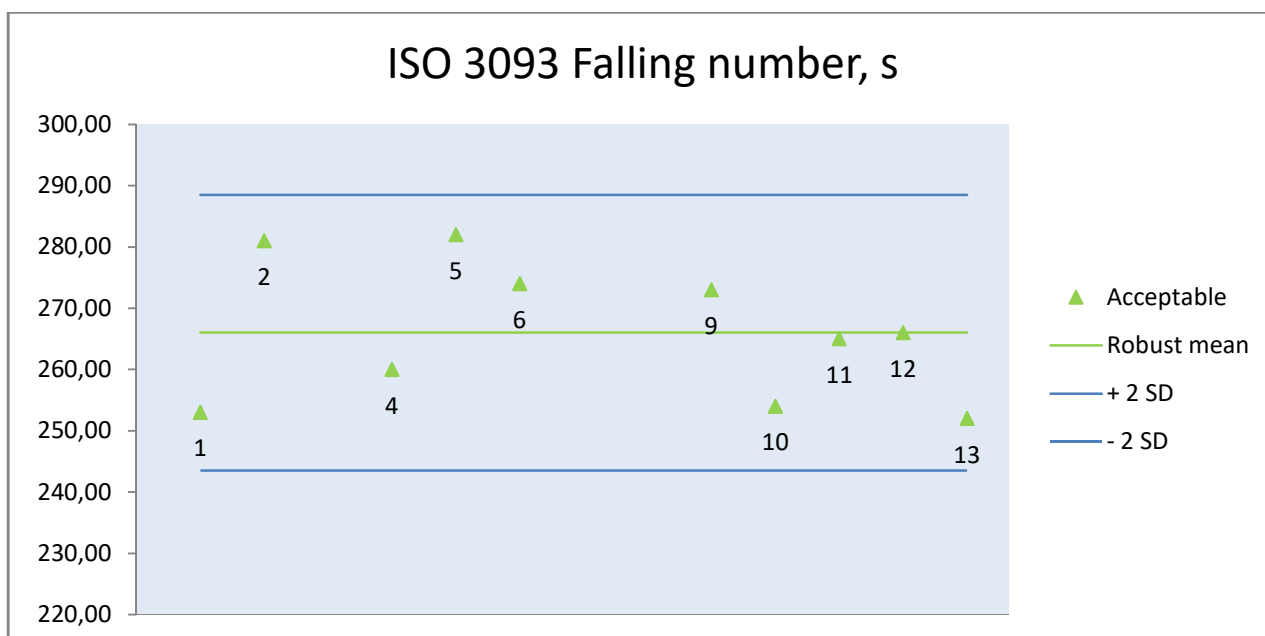
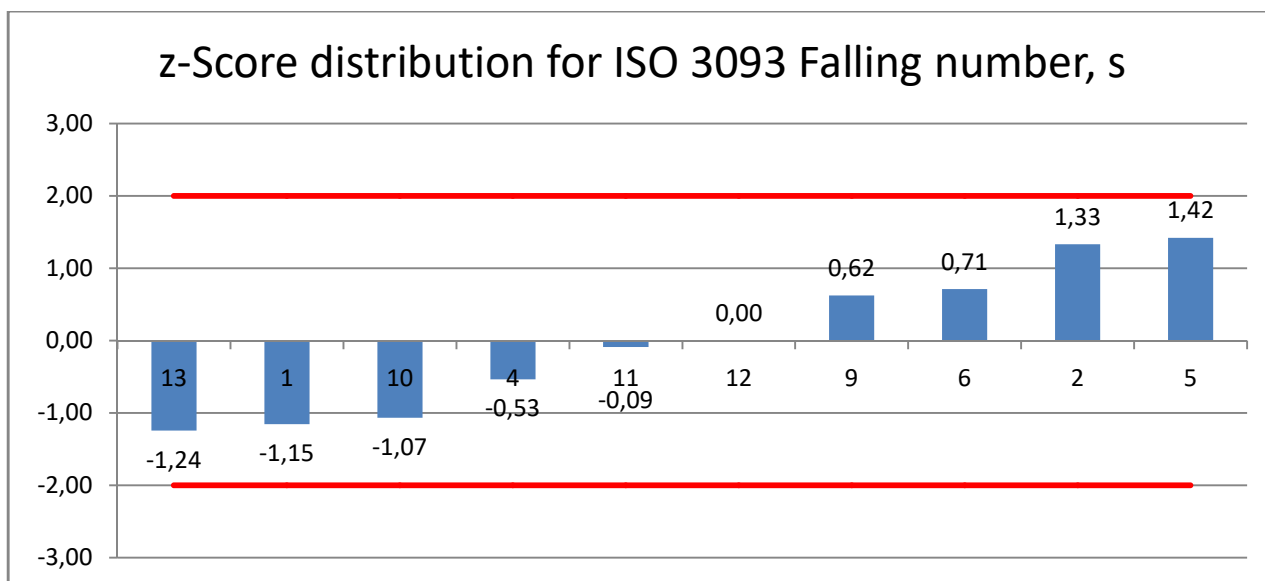
7.10. Express - infrared spectroscopy method, calibrated to ISO 712 Moisture content, %



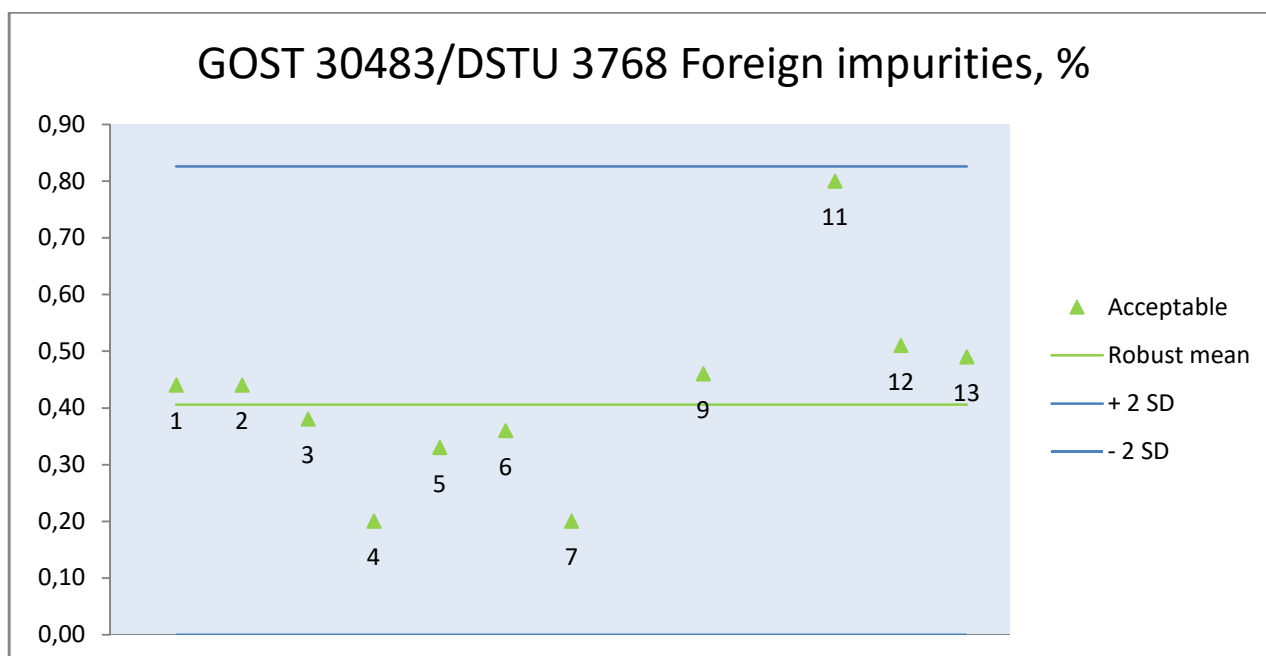
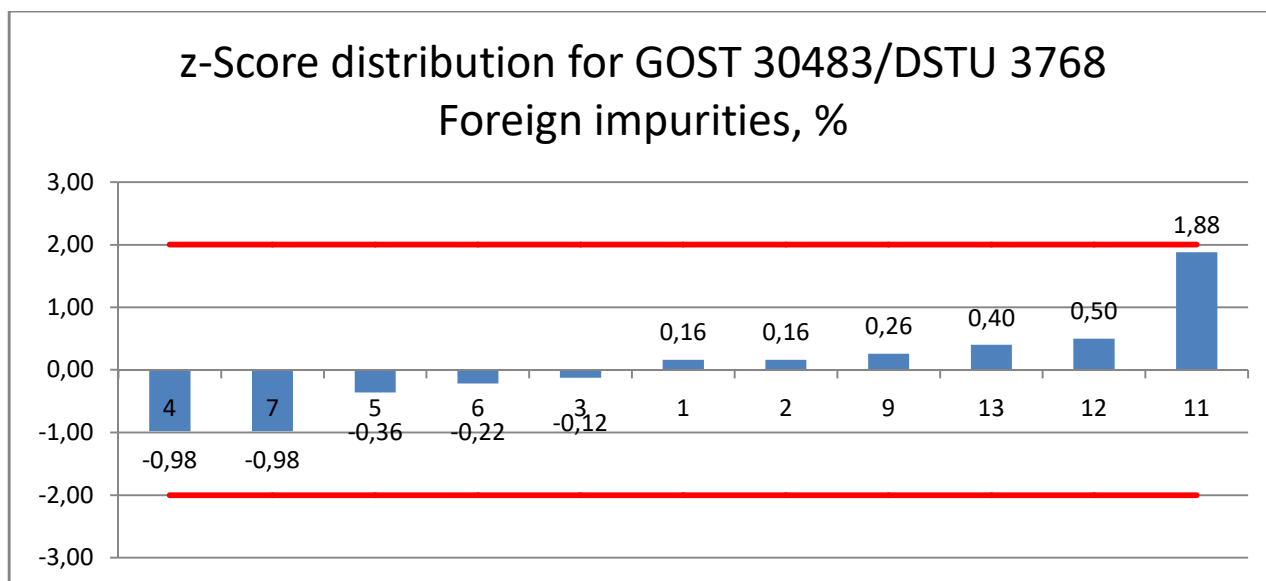
7.11. ISO 7971-3 Test weight, kg/hl



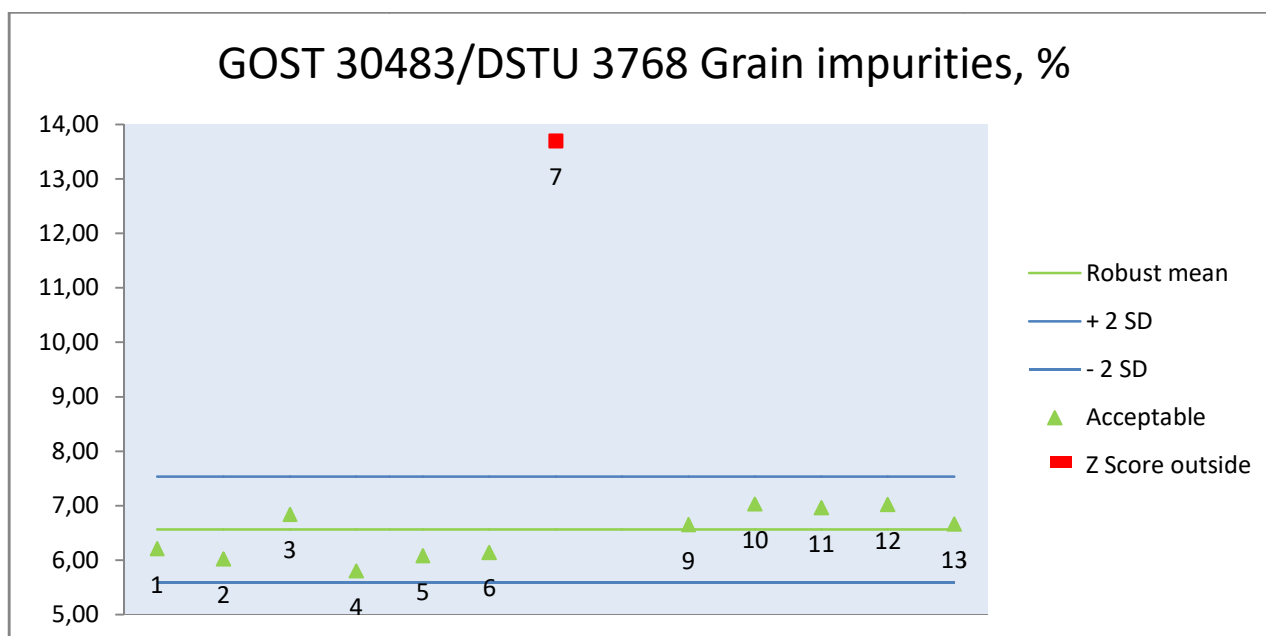
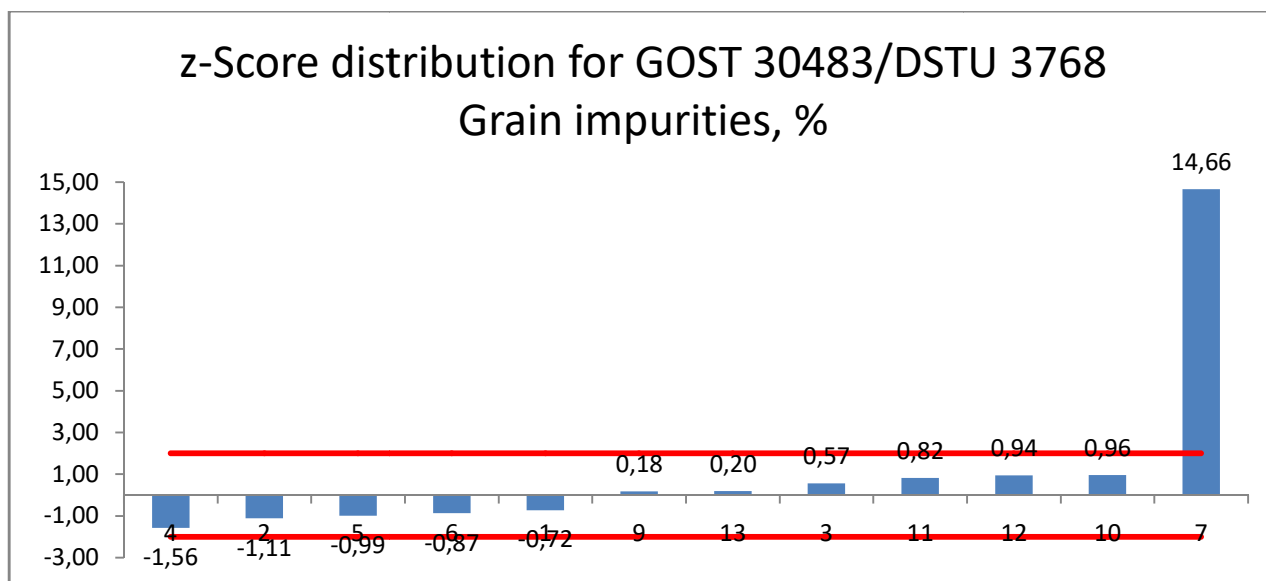
7.12. ISO 3093 Falling number, s



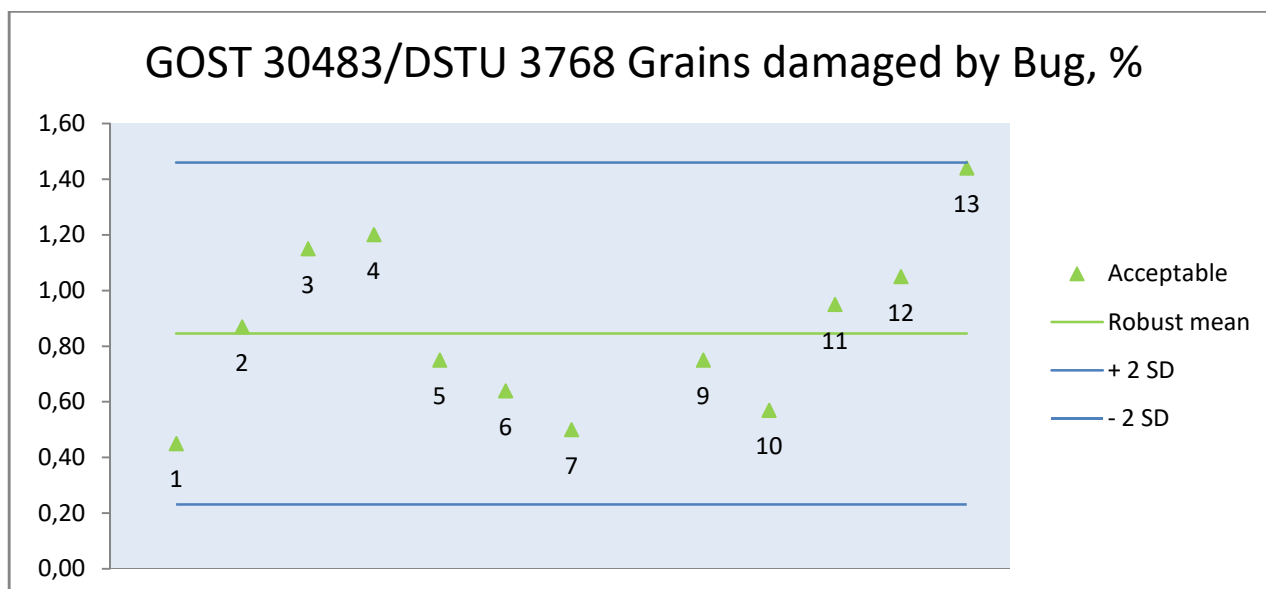
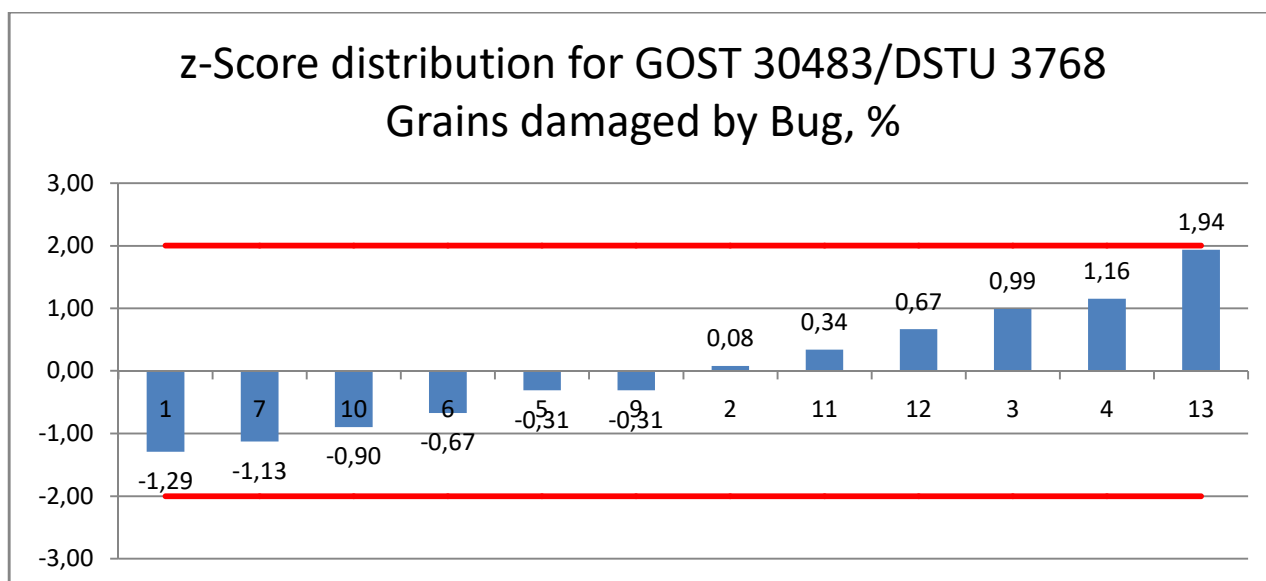
7.13. GOST 30483/DSTU 3768 Foreign impurities, %



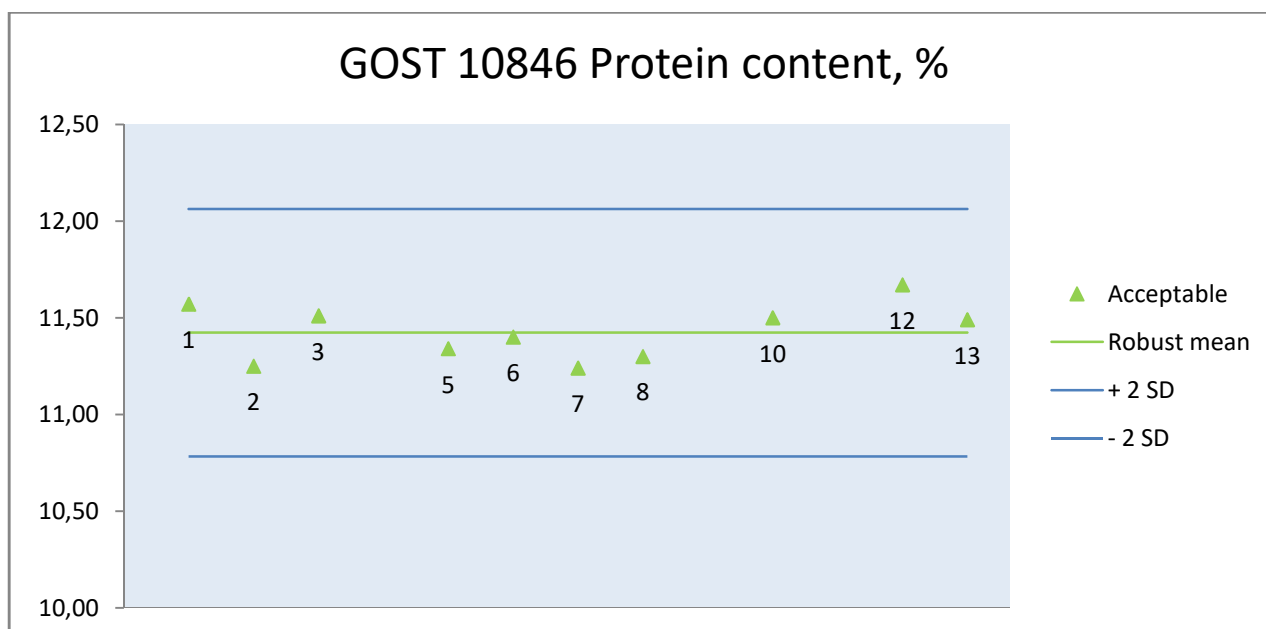
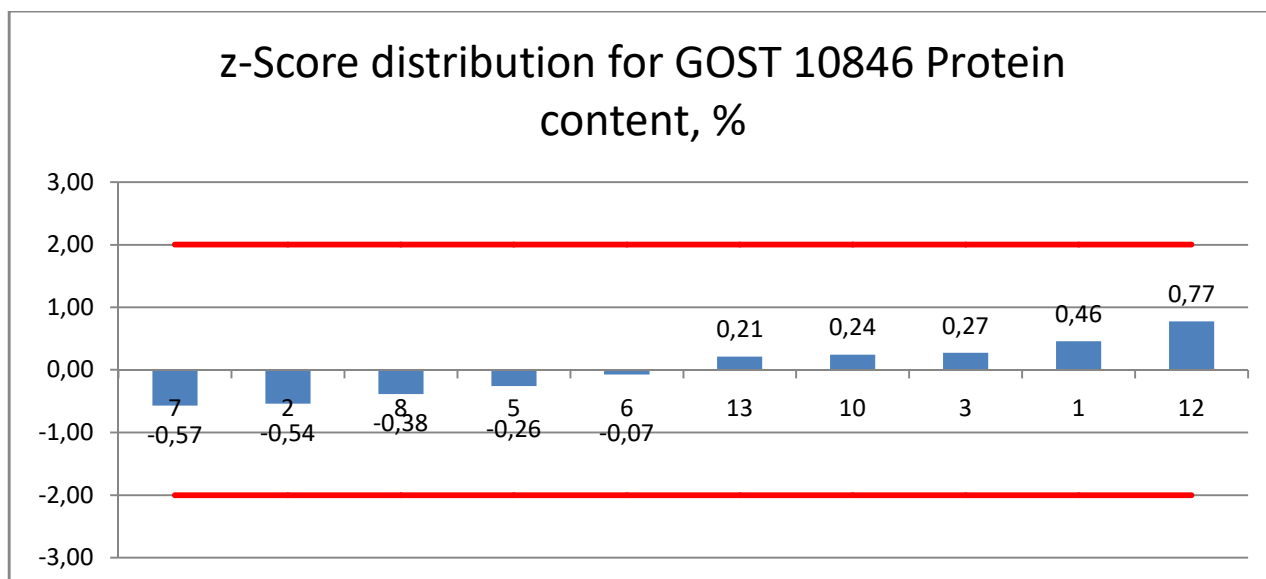
7.14. GOST 30483/DSTU 3768 Grain impurities, %



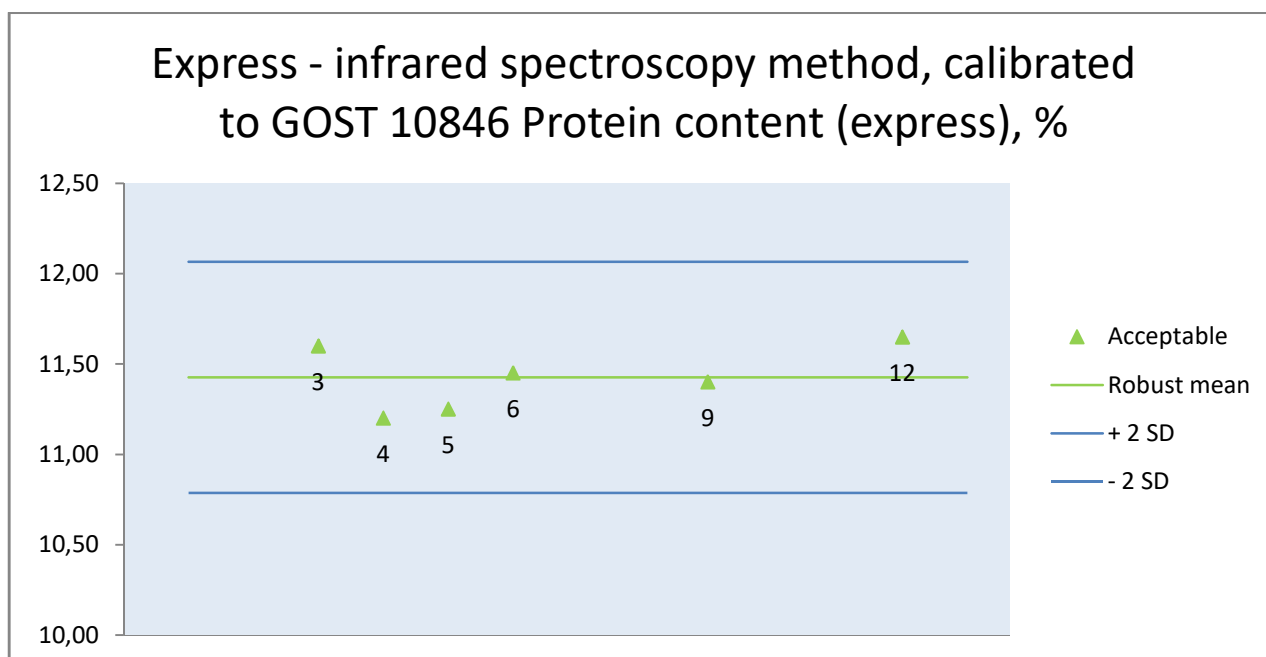
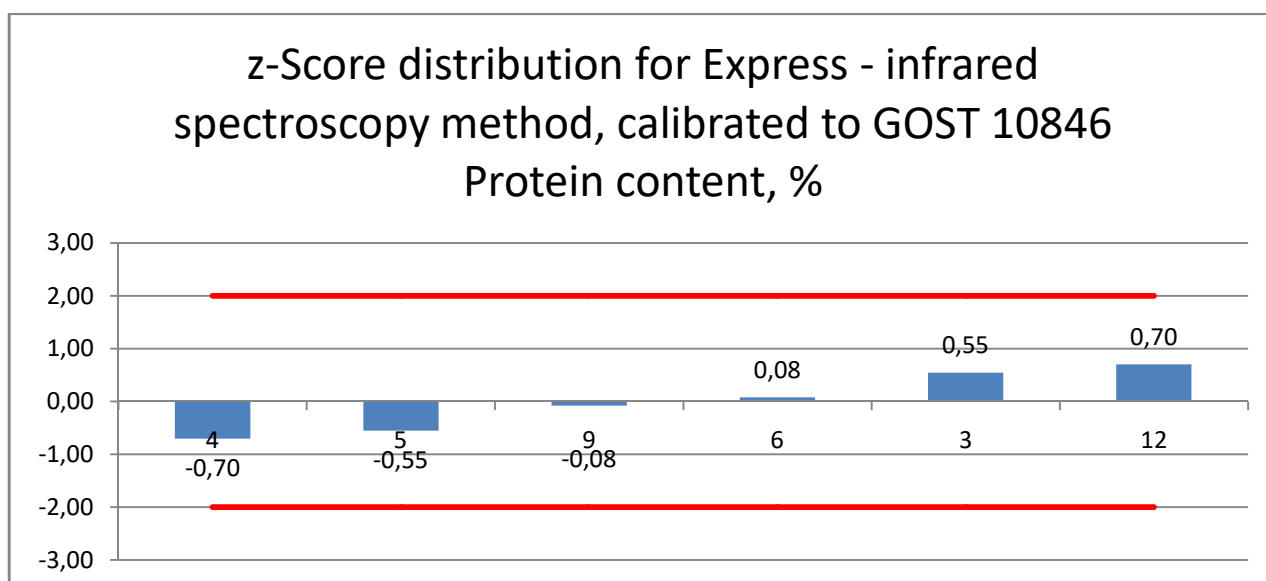
7.15. GOST 30483/DSTU 3768 Grains damaged by Bug, %



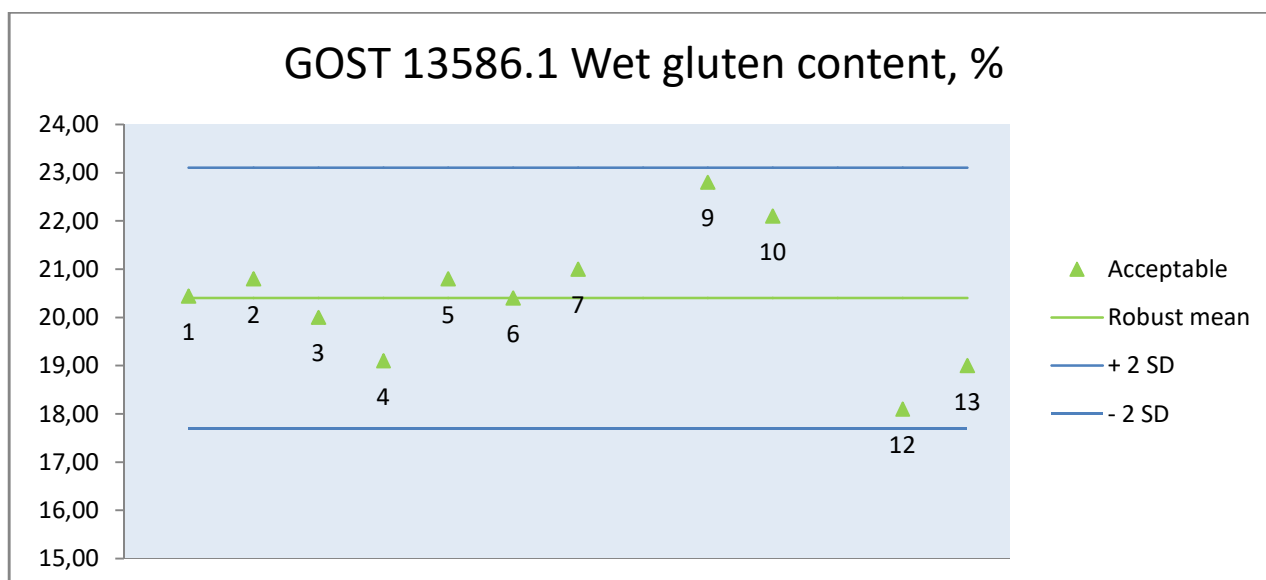
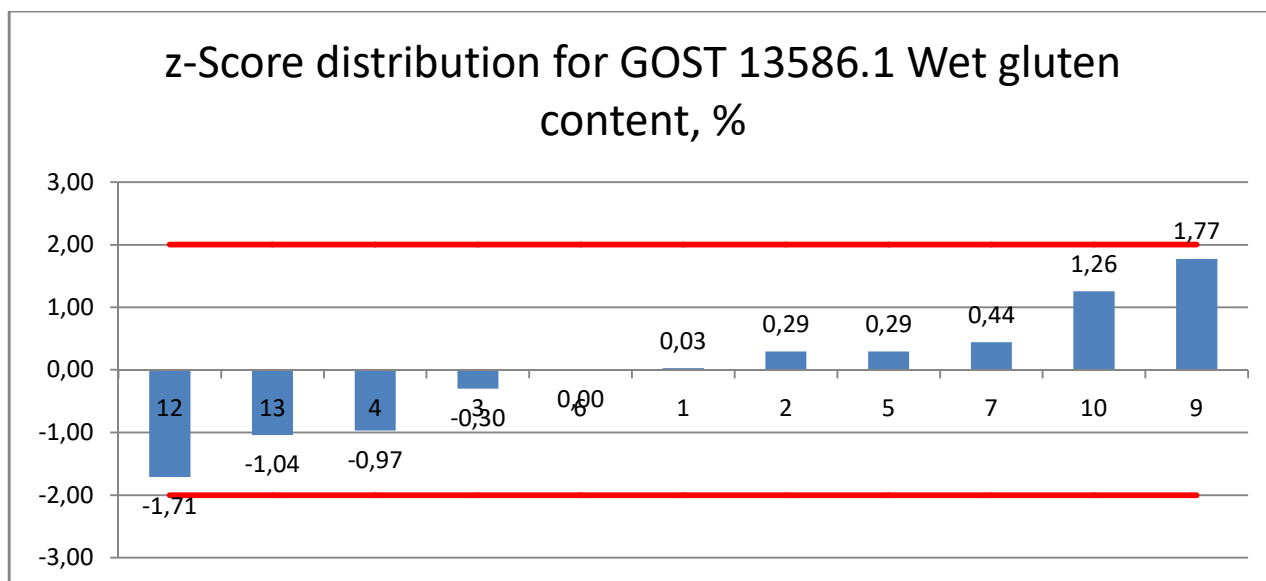
7.16. GOST 10846 Protein content, %



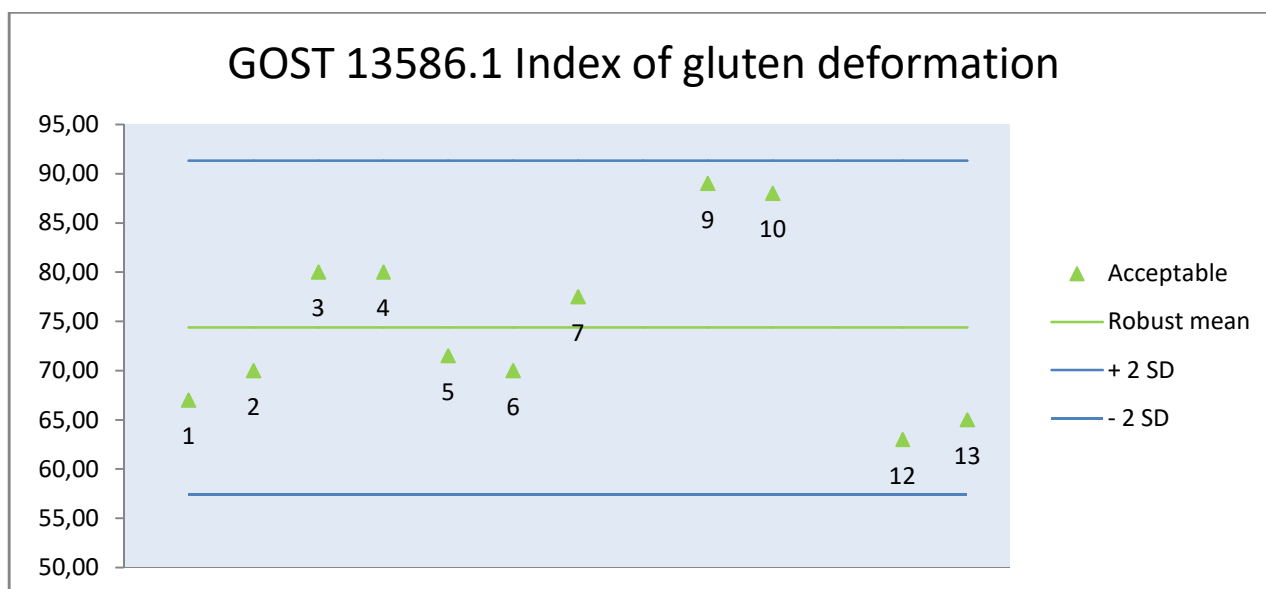
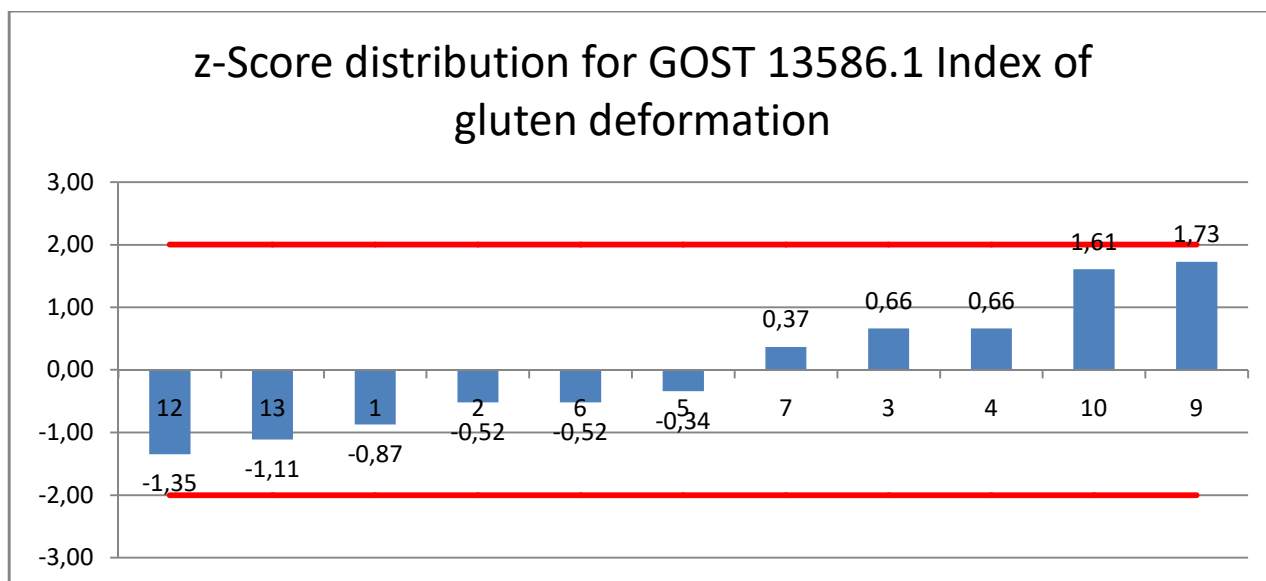
7.17. Express - infrared spectroscopy method, calibrated to GOST 10846
Protein content, %



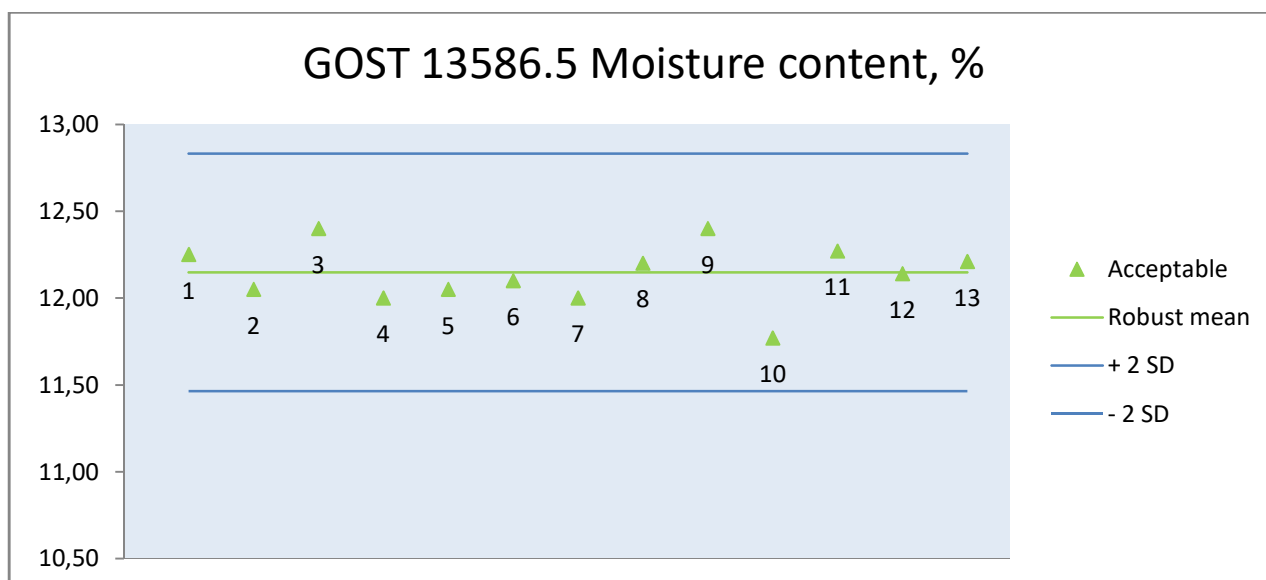
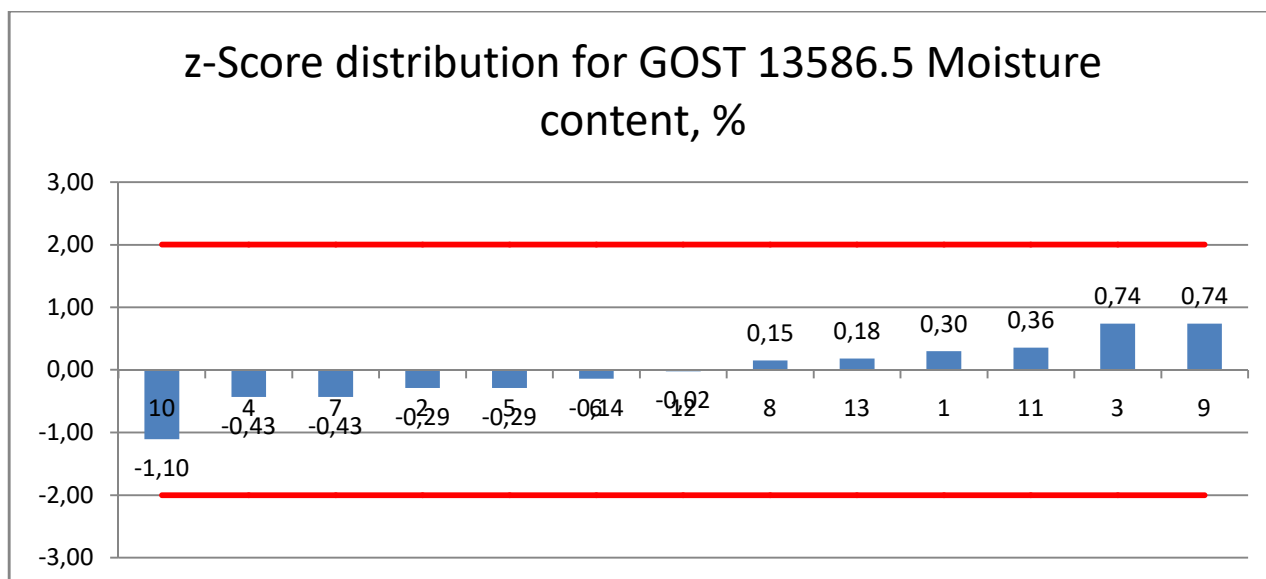
7.18. GOST 13586.1 Wet gluten content, %



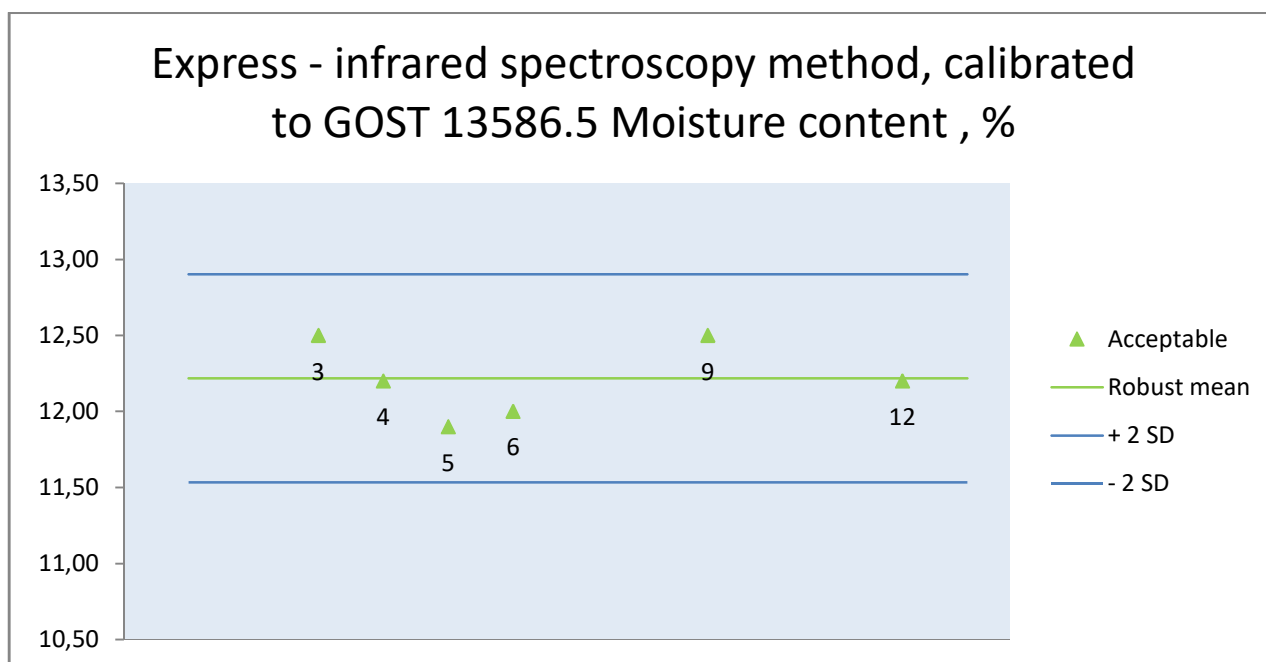
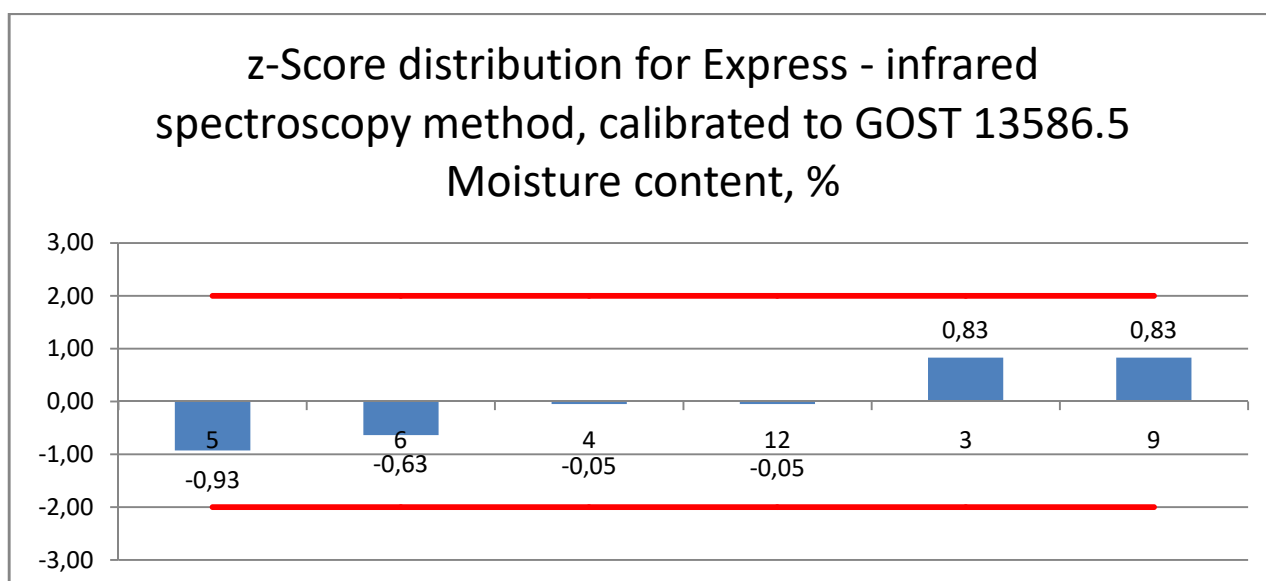
7.19. GOST 13586.1 Index of gluten deformation



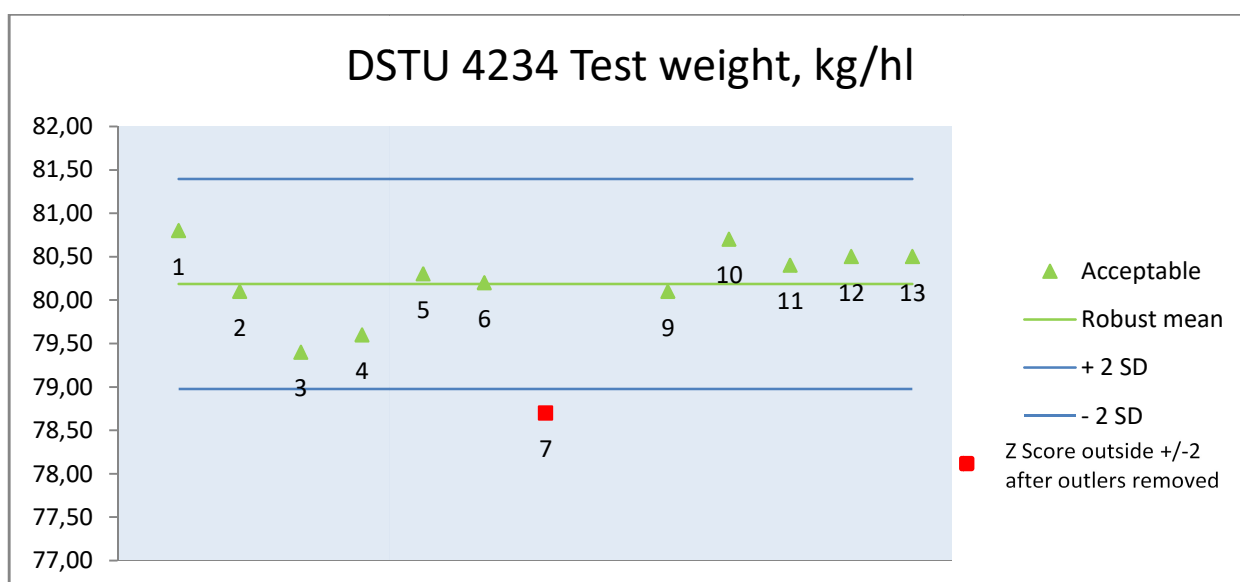
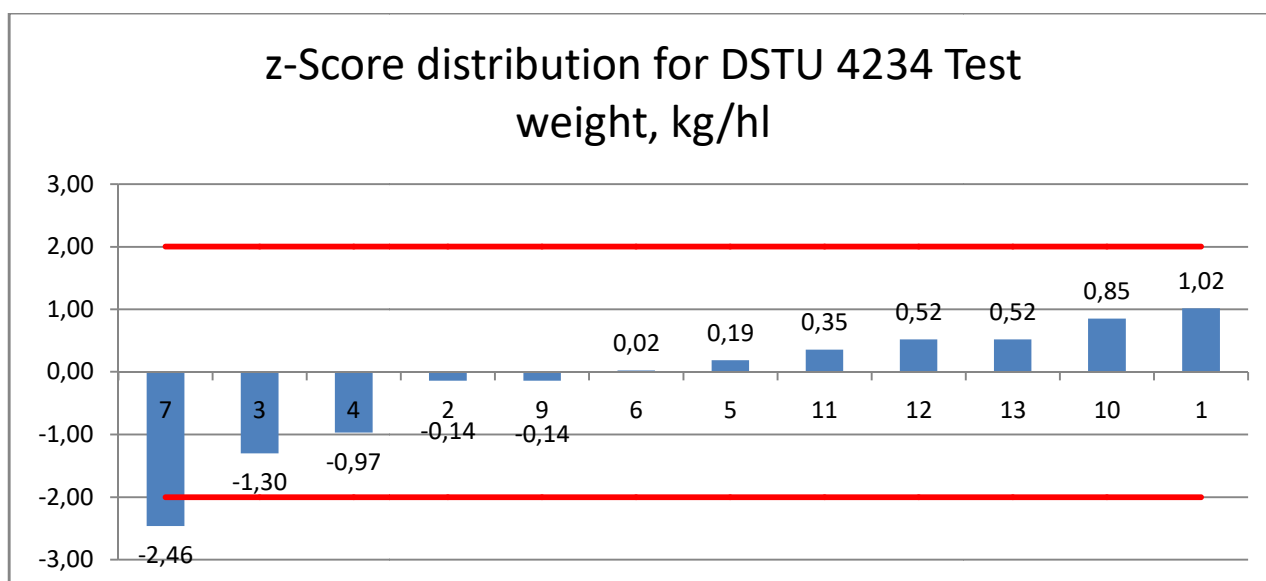
7.20. GOST 13586.5 Moisture content, %



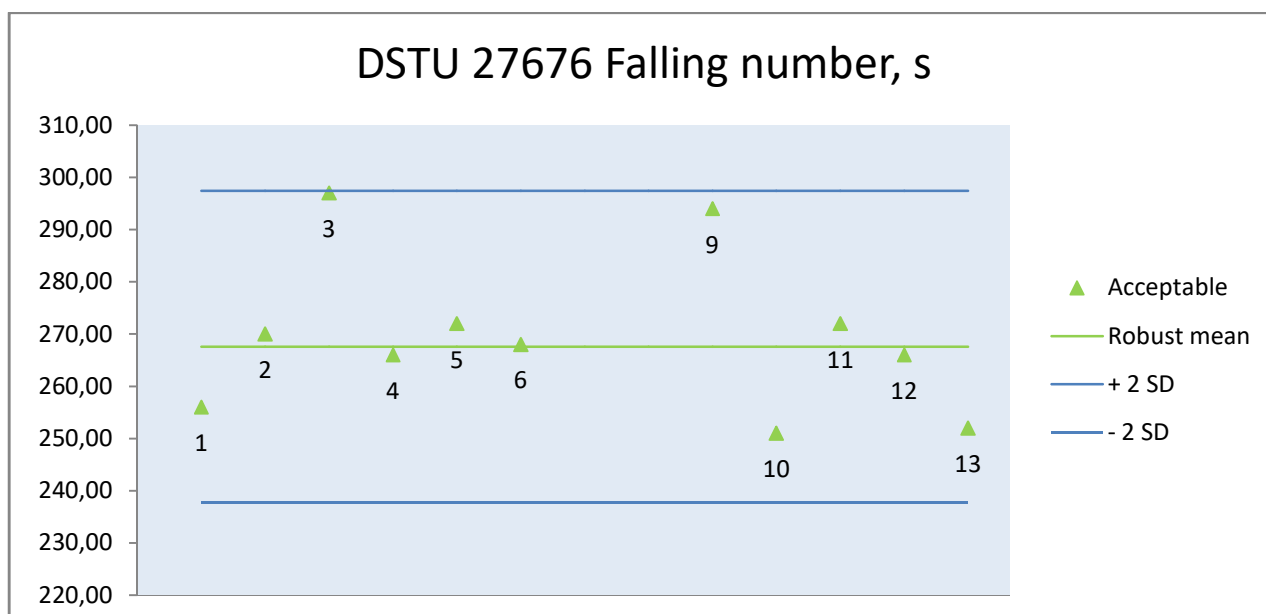
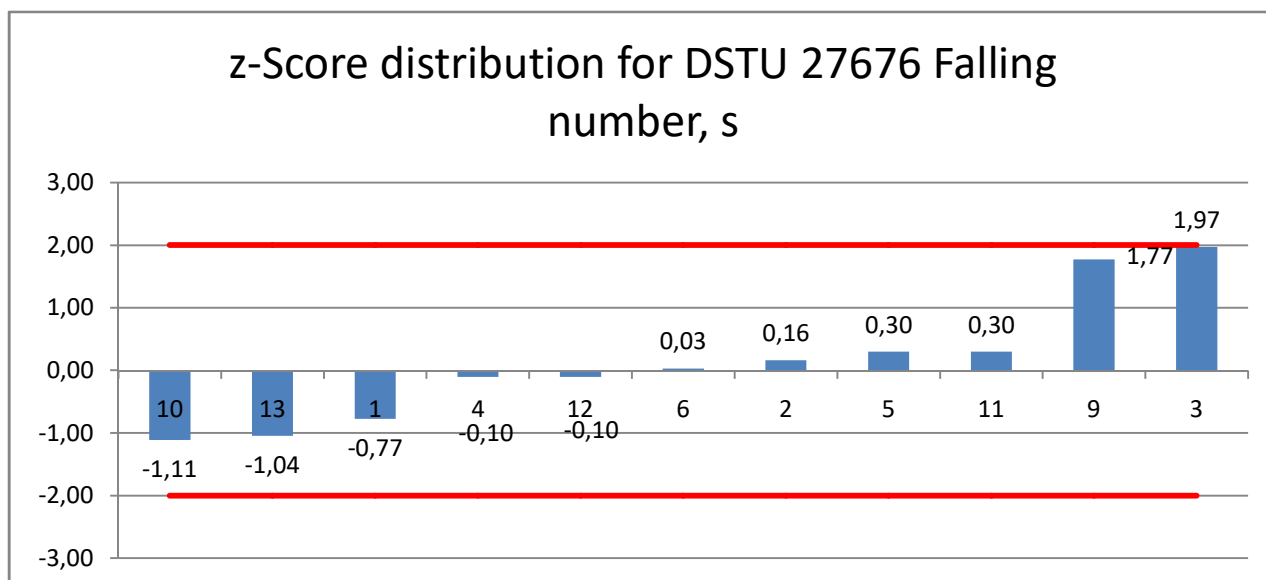
7.21. Infrared spectroscopy method, calibrated to GOST 13586.5 Moisture content, %



7.22. DSTU 4234 Test weight, kg/hl



7.23. DSTU 27676 Falling number, s



8. NORMATIVE REFERENCE

1. ISO/IEC 17043:2010 Conformity assessment -- General requirements for proficiency testing
2. Analytical Methods Committee, Robust Statistics – How not to reject outliers Part 1. Basic Concepts, Analyst, 1989, 114, 1693-1697
3. FOOD ANALYSIS PERFORMANCE ASSESSMENT SCHEME (FAPAS). Protocol for the organization and analysis of data, sixth edition, 2002.
4. Fearn, T. and Thompson, M, A new test for ‘sufficient homogeneity’, Analyst, 2001, 126, 1414-1417
5. ISO 13528:2015 Statistical methods for use in proficiency testing by interlaboratory comparisons