METROLOGY SERVICE

Director
Metrology service Ltd.


Bozhko Nataliia
February 27nd 2020

# PROFICIENCY TESTING PT.UA.1.2.2016

# MAIZE ANALYSIS (QUALITY)

# PROFICIENCY TESTING REPORT

# ROUND 4 FEBRUARY 2020

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|---|---|
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| Status: | Final |

Kyiv-2020

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## 2. SUMMARY

2.1. The purpose of proficiency testing in maize testing is to determine the characteristics of the operation (as described in ISO/IEC 17043:2010[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.1.2.2016 Round 4 held in February 2020. This report is issued according to ISO/IEC 17043[1] and PT.UA.1.2.2016 Round 4 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 43 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.

## 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 a validated 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.1.2.2016 Round 4. 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 [2-7]. 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 – **Maize (*Zéa máys*)** were dispatched 27.01.2020 according to schedule of proficiency testing programme PT.UA.1.2.2016 Round 4.

3.3.2. Each produced and identified sample was hermetically sealed.

3.3.3. A total of 43 participants in 4 countries received one sample. Results were returned from 43 participants.

The countries envolved in this round were as follows:

| | |
|---|---|
| Ukraine | 39 |
| Russia Federation | 2 |
| Moldova | 1 |
| Turkey | 1 |

## 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 [2,3]

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 $|z| \leq 2$ (marked green in tables). z-Scores were deemed questionable if $2 < |z| \leq 3$ (marked yellow in tables). If $|z| \geq 3$, the results were considered to be unsatisfactory (marked red in tables). The calculations were made according to [1,3,5].

3.5.5. Only 2.16% (10 results) of all results in this round are considered to be unsatisfactory. In Round 3, unsatisfactory results were 0,93% (3 results).

3.5.6. None of the participants provided results for «Ash content, % (Expressed on dry matter) - ДСТУ 4117:2007». Corresponding columns are not presented in tables.

3.5.7. Participants №1, №11, №17, №18, №19, №35, №38, №39, №41 and №43 stated «Test weight, g/l» by « ГОСТ 10840-64» instead of «ДСТУ ГОСТ 10840:2019 (ГОСТ 10840–2017, IDT)». These results were assessed by the Provider.

3.5.8. Participants №12, and №13 stated «Test weight, g/l» by «USDA (Grain Grading Procedures, Chapter 1 - General Information July 30, 2013)» instead of «USDA (Grain Grading Procedures, Chapter 1 - General Information, September 1, 2018)». These results were assessed by the Provider.

3.5.9. Participants №15 and №16 stated «Moisture content, %» by «ГОСТ 13586.5-2015» instead of «ГОСТ 13586.5-93». These results were assessed by the Provider.

3.5.10. Participants №15, and №16 stated «Ash yield, % (Expressed on dry matter)» by «ISO 5984:2002» instead of «ISO 2171:2007/ ДСТУ ISO 2171:2009». These results are published in the tables «RAW DATA», and «Z SCORES» but were not are taken into account by the Provider for robust mean evaluation.

3.5.11. Participant №25 reported their result for «Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25)» and «Ash yield, % (Expressed on dry matter)» according to: «ISO 5983-2:2009» and «ДСТУ ISO 5984:2004» instead of «ISO 20483:2013/ДСТУ ISO 20483:2016» and «ISO 2171:2007/ДСТУ ISO 2171:2009». These

results are published in the tables «RAW DATA», and «Z SCORES» but were not are taken into account by the Provider for robust mean evaluation.

## 4. HOMOGENITY AND STABILITY ASSESMENT

4.1. Samples were assessed for homogeneity and stability after blending and packing by selecting seven samples of material at random from all those produced. Four of these samples were tested in duplicate under repeatability conditions as only 62 samples were produced according to [7]. Three 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.

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 [3,4].

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. ISO 6540:1980 Moisture content, %

| Moisture content, % | ISO 6540:1980/ ДСТУ ISO 6540:2007 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 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' | | | | |
| | | | | | | | | | | |
| Sample number | Результат/ Result A | Результат/ Result B | Average | SD² | | Номер зразку /Sample number | Результат/ Result A | Результат/ Result B | SUM | Difference² |
| 1 | 14,18 | 14,29 | 14,24 | 0,0060 | 0,00 | 1 | 14,18 | 14,29 | 28,47 | 0,0121 |
| 2 | 14,23 | 14,28 | 14,26 | 0,0012 | 0,00 | 2 | 14,23 | 14,28 | 28,51 | 0,0025 |
| 3 | 14,24 | 14,18 | 14,21 | 0,0018 | 0,00 | 3 | 14,24 | 14,18 | 28,42 | 0,0036 |
| 4 | 14,29 | 14,29 | 14,29 | 0,0000 | 0,00 | 4 | 14,29 | 14,29 | 28,58 | 0,0000 |
| 5 | 14,26 | 14,33 | 14,30 | 0,0025 | 0,00 | 5 | 14,26 | 14,33 | 28,59 | 0,0049 |
| 6 | 14,25 | 14,26 | 14,26 | 0,0000 | 0,00 | 6 | 14,25 | 14,26 | 28,51 | 0,0001 |
| 7 | 14,31 | 14,28 | 14,30 | 0,0005 | 0,00 | 7 | 14,31 | 14,28 | 28,59 | 0,0009 |
| | | | | | | | | | | 0,0241 |
| Mean | 14,262 | | Worst pair | 0,0060 | | Mean | 14,262 | | | |
| Max | 14,33 | | SUM of SD² | 0,0121 | | Max | 14,33 | | | |
| Min | 14,18 | | C | 0,5021 | | Min | 14,18 | | | |
| | | | Ccr, 5% | 0,7271 | | | | | | |
| | | | Ccr, 1% | 0,8376 | | Analytical variance S²ar | 0,0017 | SD | 0,0439 | |
| | | | Conclusion | | | Sanal | 0,0415 | RSDR | 0,3077 | |
| | | | 5% | PASS | | Ssums | 0,0043 | | | |
| | | | 1% | PASS | | MSb | 0,0022 | | | |
| | | | | | Between sample variance S²sam | | 0,0002 | | | |
| Remarks | | | | | | | | | | |
| 1. Cohran's C test is described in ISO 5727-2 and FAPAS protocol, sixth edition, 2002 | | | | | | | | | | |
| 2. Test for 'sufficient homogenity' is performed according to FAPAS protocol, sixth edition, 2002 | | | | | | | | | | |

| Source of σp value to use | | |
|---|---|---|
| Use(write '1') | Source | σp |
| 1 | C>13.8%, HORWITZ | 0,3777 |
| | 120ppb<C<13.8%, HORWITZ | 0,3824 |
| | C<120 ppb | 3,137671 |
| MASS NEGATIVE POWER FOR HORWITZ EQUATION(%=2, ppb=9,ppm=6) | | 2 |
| | SD | 0,0423 |
| | Trial SD | 3,9800 |
| | | |
| | Target SD chosen | 0,3777 |
| | σ²all | 0,012836 |
| | Replicates | 7 |
| | F1 | 2,1 |
| | F2 | 1,43 |
| | Critical value | 0,0294 |
| | Between sample variance S²sam | 0,0002 |
| | Sufficient homogenity test | PASS |

## 4.5. Data for all analytes

| Method | EN 16378:2013 | EN 16378:2013 | EN 16378:2013 | ISO 6540:1980/ ДСТУ ISO 6540:2007 | ISO 20483:2013/ ДСТУ ISO 20483:2016 | ISO 16634-2:2016 | ISO 2171:2007/ ДСТУ ISO 2171:2009 | ISO 6492:1999/ ДСТУ ISO 6492:2003 | ISO 6865:2000/ ДСТУ ISO 6865:2004 | GAFTA 7.0:2018 | ДСТУ ГОСТ 10840:2019 (ГОСТ 10840–2017, IDT) | ГОСТ 13586.5-93 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Broken grains, % | Grain impurities, % | Miscellaneous impurities, % | Moisture content, % | Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25) | Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25) | Ash yield, % (Expressed on dry matter) | 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) | Volatile nitrogenous basis, % | Test weight, g/l | Moisture content, % |
| Гомогенність та стабільність | | | | | | | | | | | | |
| С-тест "Кохрана" | | | | | | | | | | | | |
| Crtitical value(5%,10pairs)=0,602 | 0,6107 | 0,6494 | 0,6050 | 0,5021 | 0,4757 | 0,4033 | 0,2319 | 0,3956 | 0,2873 | 0,2500 | 0,3750 | 0,3903 |
| Mean Result | 3,0179 | 1,5593 | 1,3500 | 14,2621 | 8,3579 | 8,3929 | 1,2265 | 3,4721 | 1,9272 | 0,0171 | 724,5714 | 13,9893 |
| Conclusion(Висновок) | PASS | PASS | PASS | PASS | PASS | PASS | PASS | PASS | PASS | PASS | PASS | PASS |
| Analytical variance test(тест аналітичної дисперсії) | | | | | | | | | | | | |
| $S^2$anal | 0,0079 | 0,0063 | 0,0014 | 0,0017 | 0,0066 | 0,0021 | 0,0000 | 0,0072 | 0,0013 | 0,0000 | 1,7143 | 0,0031 |
| Sanal | 0,0889 | 0,0796 | 0,0378 | 0,0415 | 0,0814 | 0,0463 | 0,0058 | 0,0850 | 0,0354 | 0,0053 | 1,3093 | 0,0556 |
| $S^2$sample | 0 | 0,0036 | 0,0045 | 0,0002 | 0,0013 | 0,0040 | 0,0000 | 0 | 0,0028 | 0 | 0,9286 | 0 |
| $\sigma_p$ | 0,2460 | 0,5120 | 0,3360 | 0,3777 | 0,1400 | 0,2437 | 0,0476 | 0,1380 | 0,2170 | 0,0150 | 6,0330 | 0,3740 |
| $\sigma_p$ source | Trial SD | Trial SD | Trial SD | Horwitz | Method Tr SD | Horwitz | Horwitz | Trial SD | Trial SD | Trial SD | Trial SD | Horwitz |
| $\sigma^2$all | 0,0054 | 0,0236 | 0,0102 | 0,0128 | 0,0018 | 0,0053 | 0,0002 | 0,0017 | 0,0042 | 0,0000 | 3,2757 | 0,0126 |
| Critical value | 0,0227 | 0,0586 | 0,0234 | 0,0294 | 0,0132 | 0,0143 | 0,0005 | 0,0139 | 0,0107 | 0,0001 | 9,3305 | 0,0309 |
| Conclusion(Висновок) | PASS | PASS | PASS | PASS | PASS | PASS | PASS | PASS | PASS | PASS | PASS | PASS |

# 5. DATA SUMMARY

| Method | EN 16378:2013 | EN 16378:2013 | EN 16378:2013 | ISO 19942:2018 | ISO 19942:2018 | ISO 19942:2018 | ISO 19942:2018 | ISO 6540:1980/ ДСТУ ISO 6540:2007 | ISO 20483:2013/ ДСТУ ISO 20483:2016 | ISO 16634-2:2016 | ISO 12099:2017 | ISO 2171:2007/ ДСТУ ISO 2171:2009 | ISO 6492:1999/ ДСТУ ISO 6492:2003 | ISO 12099:2017 | ISO 6865:2000/ ДСТУ ISO 6865:2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Broken grains, % | Grain impurities, % | Miscellaneous impurities, % | Broken grains, % | Damaged grains, % | Other grains, % | Miscellaneous impurities, % | Moisture content, % | Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25) | Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25) | Crude protein content, % (Expressed on dry matter, factor forconverting nitrogen content to protein content - 6.25) | Ash yield, % (Expressed on dry matter) | 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) |
| No of Results | 19 | 19 | 18 | 11 | 12 | 12 | 11 | 24 | 16 | 3 | 6 | 13 | 15 | 5 | 16 |
| No of Results \|z\|>3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 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 | 6,250 | 0,000 | 16,667 | 0,000 | 0,000 | 0,000 | 0,000 |
| Mean | 2,833 | 1,343 | 1,074 | 2,904 | 1,308 | 0,216 | 1,096 | 13,962 | 8,281 | 8,503 | 8,225 | 1,214 | 3,509 | 3,428 | 1,833 |
| Min | 2,360 | 0,450 | 0,670 | 2,700 | 0,620 | 0,090 | 0,720 | 13,570 | 6,990 | 8,320 | 7,450 | 1,150 | 3,280 | 3,310 | 1,480 |
| Max | 3,350 | 2,510 | 1,500 | 3,110 | 1,800 | 0,500 | 1,830 | 14,310 | 8,480 | 8,750 | 8,750 | 1,280 | 3,850 | 3,650 | 2,280 |
| SD | 0,220 | 0,563 | 0,233 | 0,154 | 0,400 | 0,098 | 0,300 | 0,183 | 0,352 | 0,222 | 0,443 | 0,038 | 0,160 | 0,145 | 0,219 |
| Median | 2,840 | 1,300 | 1,080 | 2,970 | 1,445 | 0,200 | 1,070 | 13,995 | 8,380 | 8,440 | 8,265 | 1,200 | 3,500 | 3,340 | 1,825 |
| Robust mean (assigned value) | 2,833 | 1,327 | 1,070 | 2,904 | 1,318 | 0,199 | 1,049 | 13,973 | 8,361 | 8,503 | 8,279 | 1,224 | 3,499 | 3,424 | 1,819 |
| Robust SD | 0,162 | 0,512 | 0,211 | 0,154 | 0,381 | 0,029 | 0,174 | 0,147 | 0,070 | 0,222 | 0,337 | 0,034 | 0,137 | 0,137 | 0,180 |
| SD from method (Tr.SD) | 0,740 | 0,930 | 0,850 | 0,609 | 0,509 | 0,102 | 0,918 | N/A | 0,140 | 0,330 | N/A | 0,033 | 0,199 | N/A | N/A |
| SD from Horwitz eq. | 0,097 | 0,051 | 0,042 | 0,099 | 0,051 | 0,010 | 0,042 | 0,376 | 0,243 | 0,246 | 0,241 | 0,047 | 0,116 | 0,114 | 0,067 |
| Target SD | 0,246 | 0,512 | 0,336 | 0,154 | 0,381 | 0,102 | 0,262 | 0,376 | 0,140 | 0,246 | 0,241 | 0,047 | 0,138 | 0,114 | 0,217 |
| Source of target SD of PT | Trial SD | Trial SD | Trial SD | Trial SD | Trial SD | Method Tr SD | Trial SD | Horwitz | Method Tr SD | Horwitz | Horwitz | Horwitz | Trial SD | Horwitz | Trial SD |

| Method | ISO 12099:2017 | GAFTA 7.0:2018 | USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) | USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) | USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) | USDA (Grain Grading Procedures, Chapter 1 - General Information, September 1, 2018) | ДСТУ ГОСТ 10840:2019 (ГОСТ 10840–2017, IDT) | ГОСТ 30483-97/ ДСТУ 4525:2006 | ГОСТ 30483-97/ ДСТУ 4525:2006 | ГОСТ 13586.5-93 | ДСТУ 4117:2007 | ДСТУ 7169:2010 | ГОСТ 10847-74 | ГОСТ 13496.15-97 | ГОСТ 13496.2-91 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Crude fibre content, % (Expressed as a mass fraction of the product as received) | Volatile nitrogenous basis, % | Broken Corn, % | Foreign Material, % | Damaged kernels, % | Test weight, lbu/bu | Test weight, g/l | Foreign impurities, % | Grain impurities, % | Moisture content, % | Moisture content, % | Mass fraction of crude protein, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.0) | Ash content, % (Expressed on dry matter) | Mass fraction of crude fat, % (Expressed on dry matter) | Mass fraction of crude fibre, % (Expressed on dry matter) |
| No of Results | 2 | 3 | 10 | 10 | 10 | 9 | 32 | 37 | 37 | 41 | 23 | 15 | 9 | 12 | 12 |
| No of Results \|z\|>3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 1 | 0 | 3 | 0 |
| No of Results \|z\|>3, % | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 3,125 | 0,000 | 8,108 | 0,000 | 0,000 | 6,667 | 0,000 | 25,000 | 0,000 |
| Mean | 2,015 | 0,023 | 3,329 | 0,862 | 1,791 | 57,252 | 727,304 | 1,163 | 4,678 | 13,676 | 13,846 | 7,971 | 1,229 | 3,852 | 2,046 |
| Min | 1,910 | 0,013 | 2,970 | 0,680 | 1,130 | 55,940 | 712,000 | 0,300 | 2,830 | 13,130 | 12,870 | 6,880 | 1,160 | 3,310 | 1,530 |
| Max | 2,120 | 0,041 | 3,680 | 1,030 | 3,250 | 59,000 | 763,000 | 1,750 | 8,900 | 14,000 | 14,300 | 8,550 | 1,310 | 4,330 | 3,350 |
| SD | 0,148 | 0,015 | 0,245 | 0,112 | 0,703 | 1,324 | 9,252 | 0,296 | 1,341 | 0,172 | 0,299 | 0,367 | 0,047 | 0,300 | 0,465 |
| Median | 2,015 | 0,016 | 3,320 | 0,865 | 1,555 | 56,330 | 724,000 | 1,180 | 4,280 | 13,700 | 13,900 | 7,975 | 1,210 | 3,845 | 1,945 |
| Robust mean (assigned value) | 2,015 | 0,023 | 3,329 | 0,864 | 1,723 | 57,252 | 726,089 | 1,196 | 4,414 | 13,693 | 13,886 | 7,998 | 1,227 | 3,858 | 1,967 |
| Robust SD | 0,148 | 0,015 | 0,245 | 0,107 | 0,565 | 1,324 | 5,531 | 0,189 | 0,726 | 0,101 | 0,166 | 0,156 | 0,042 | 0,268 | 0,233 |
| SD from method (Tr.SD) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0,300 | 1,000 | 0,700 | N/A | N/A | N/A | N/A | N/A |
| SD from Horwitz eq. | 0,073 | 0,002 | 0,111 | 0,035 | 0,064 | N/A | N/A | 0,047 | 0,141 | 0,369 | 0,374 | 0,234 | 0,048 | 0,126 | 0,071 |
| Target SD | 0,073 | 0,015 | 0,245 | 0,107 | 0,565 | 1,387 | 6,033 | 0,300 | 1,000 | 0,369 | 0,374 | 0,234 | 0,048 | 0,126 | 0,557 |
| Source of target SD of PT | Horwitz | Trial SD | Trial SD | Trial SD | Trial SD | Trial SD | Trial SD | Method Tr SD | Method Tr SD | Horwitz | Horwitz | Horwitz | Horwitz | Horwitz | Trial SD |

# 6. RAW DATA

| Method | EN 16378:2013 | EN 16378:2013 | EN 16378:2013 | ISO 19942:2018 | ISO 19942:2018 | ISO 19942:2018 | ISO 19942:2018 | ISO 6540:1980/ ДСТУ ISO 6540:2007 | ISO 20483:2013/ ДСТУ ISO 20483:2016 | ISO 16634-2:2016 | ISO 12099:2017 | ISO 2171:2007/ ДСТУ ISO 2171:2009 | ISO 6492:1999/ ДСТУ ISO 6492:2003 | ISO 12099:2017 | ISO 6865:2000/ ДСТУ ISO 6865:2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory n | Broken grains, % | Grain impurities, % | Miscellaneous impurities, % | Broken grains, % | Damaged grains, % | Other grains, % | Miscellaneous impurities, % | Moisture content, % | Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25) | Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25) | Crude protein content, % (Expressed on dry matter, factor forconverting nitrogen content to protein content - 6.25) | Ash yield, % (Expressed on dry matter) | 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) |
| 1 | | | | | | | | | | | | | | | |
| 2 | 2,96 | 0,57 | 0,67 | | | | | 13,92 | | | | | | | |
| 3 | 2,98 | 1,64 | 1,40 | 3,03 | 1,45 | 0,22 | 1,38 | 14,19 | 8,41 | 8,44 | | 1,22 | 3,45 | | 1,91 |
| 4 | 2,93 | 1,17 | 1,17 | | | | | 14,00 | | | | | | | |
| 5 | 2,84 | 0,74 | 1,24 | | | | | 13,90 | | | | | | | |
| 6 | | | | | | | | | | | | | | | |
| 7 | 2,81 | 1,47 | 1,05 | 2,72 | 0,94 | 0,18 | 1,08 | 14,04 | 8,44 | 8,75 | 8,52 | 1,19 | 3,54 | | 2,18 |
| 8 | 2,80 | 0,82 | 1,18 | 2,80 | 0,62 | 0,20 | 1,12 | 14,00 | 8,44 | | | 1,19 | | | 2,28 |
| 9 | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | |
| 12 | 2,84 | 1,87 | 1,21 | 2,78 | 1,64 | 0,21 | 1,07 | 14,09 | 8,30 | | 8,28 | 1,28 | 3,73 | 3,65 | 1,70 |
| 13 | 3,05 | 1,81 | 1,41 | 2,99 | 0,79 | 0,16 | 1,83 | 14,31 | | | 8,25 | | | 3,50 | |
| 14 | 2,84 | 2,10 | 0,83 | 3,11 | 1,76 | 0,25 | 1,13 | 14,16 | | | | | | | |
| 15 | 3,00 | 1,20 | 0,85 | 3,10 | 1,50 | 0,20 | 0,72 | 13,99 | 8,33 | | | 1,20 | 3,30 | | 1,70 |
| 16 | 3,07 | 1,30 | 0,77 | 2,97 | 1,44 | 0,22 | 0,80 | 14,05 | 8,29 | | | 1,15 | 3,28 | | 1,74 |
| 17 | 2,75 | 1,88 | 0,98 | 2,76 | 1,80 | 0,50 | 1,02 | 13,80 | 8,48 | | | 1,25 | 3,62 | | 1,55 |
| 18 | 3,35 | 2,51 | 0,91 | | | | | 13,57 | | | | | | | |
| 19 | | | | | | | | 13,90 | | | | | 3,85 | | 1,89 |
| 20 | 2,75 | 1,87 | 0,85 | 2,98 | 1,37 | 0,09 | 0,91 | 13,90 | 8,20 | | 8,10 | 1,26 | 3,60 | 3,31 | 1,48 |
| 21 | 2,36 | 0,81 | | | 0,86 | 0,18 | | 13,72 | 8,42 | | | 1,24 | 3,50 | | 2,01 |
| 22 | | | | | | | | | 8,41 | | | | | | |
| 23 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |
| 25 | | | | | | | | 13,68 | 8,38 | 8,32 | 8,75 | 1,18 | 3,55 | 3,34 | 1,80 |
| 26 | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | |
| 35 | 2,69 | 0,45 | 1,08 | | | | | 13,66 | 6,99 | | 7,45 | | 3,29 | 3,34 | 1,85 |
| 36 | 2,62 | 1,07 | 1,15 | | | | | 14,05 | 8,36 | | | 1,20 | 3,45 | | 2,00 |
| 37 | 2,64 | 0,94 | 1,08 | 2,70 | 1,52 | 0,18 | 1,00 | 14,12 | 8,40 | | | 1,24 | 3,50 | | 1,94 |
| 38 | 2,54 | 1,30 | 1,50 | | | | | 14,14 | 8,27 | | | 1,18 | 3,59 | | 1,62 |
| 39 | | | | | | | | 13,93 | | | | | | | |
| 40 | | | | | | | | | | | | | | | |
| 41 | | | | | | | | 14,12 | | | | | | | |
| 42 | | | | | | | | 13,84 | 8,38 | | | | 3,39 | | 1,67 |
| 43 | | | | | | | | | | | | | | | |

| Method | ISO 12099:2017 | GAFTA 7.0:2018 | USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) | USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) | USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) | USDA (Grain Grading Procedures, Chapter 1 - General Information, September 1, 2018) | ДСТУ ГОСТ 10840:2019 (ГОСТ 10840–2017, IDT) | ГОСТ 30483-97/ ДСТУ 4525:2006 | ГОСТ 30483-97/ ДСТУ 4525:2006 | ГОСТ 13586.5-93 | ДСТУ 4117:2007 | ДСТУ 7169:2010 | ГОСТ 10847-74 | ГОСТ 13496.15-97 | ГОСТ 13496.2-91 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory n | Crude fibre content, % (Expressed as a mass fraction of the product as received) | Volatile nitrogenous basis, % | Broken Corn, % | Foreign Material, % | Damaged kernels, % | Test weight, lbu/bu | Test weight, g/l | Foreign impurities, % | Grain impurities, % | Moisture content, % | Moisture content, % | Mass fraction of crude protein, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.0) | Ash content, % (Expressed on dry matter) | Mass fraction of crude fat, % (Expressed on dry matter) | Mass fraction of crude fibre, % (Expressed on dry matter) |
| 1 | | | | | | | 739,00 | 1,18 | 4,28 | 13,80 | 14,10 | | | | |
| 2 | | | | | | | | 1,11 | 4,22 | 13,70 | | | | | |
| 3 | | 0,016 | 3,19 | 0,94 | 3,25 | 56,33 | 725,00 | 1,48 | 4,42 | 13,94 | | 8,05 | 1,19 | 4,00 | 2,19 |
| 4 | | | 3,27 | 1,03 | 1,78 | 56,20 | 723,00 | 1,19 | 3,69 | 13,60 | 13,90 | | | | |
| 5 | | | | | | | 722,00 | 1,02 | 3,42 | 13,90 | 14,00 | | | | |
| 6 | | | | | | | | 1,15 | 5,64 | 13,70 | | | | | |
| 7 | | 13мг/100г (0,013%) | 3,02 | 0,90 | 1,33 | 55,94 | 720,00 | 1,00 | 3,88 | 13,75 | | 8,14 | 1,21 | 3,67 | 1,70 |
| 8 | | | 3,18 | 1,00 | 1,30 | 56,00 | 720,00 | 1,00 | 3,90 | 13,65 | 13,75 | 8,22 | 1,21 | 3,67 | 1,70 |
| 9 | | | | | | | | 1,10 | 3,93 | 13,90 | 13,90 | | | | |
| 10 | | | | | | | | | | | | 7,98 | | 3,67 | 1,88 |
| 11 | | | | | | | 722 | 1,28 | 4,11 | 13,70 | 13,90 | | | | |
| 12 | | 0,041 | 3,68 | 0,79 | 2,50 | 59,0 | 722 | 1,24 | 4,25 | 13,61 | 14,00 | 7,85 | 1,31 | 4,26 | 1,95 |
| 13 | | | 3,63 | 0,81 | 2,24 | 58,8 | 729 | 1,40 | 4,86 | 14,00 | 14,15 | | | | |
| 14 | | | | | | | 734 | 1,13 | 4,75 | 13,80 | | | | | |
| 15 | | | 3,45 | 0,90 | 1,13 | 58,3 | 722 | | | 13,70 | | | | | |
| 16 | | | 3,37 | 0,83 | 1,20 | 58,4 | 721 | | | 13,79 | | | | | |
| 17 | | | | | | | 734,00 | 1,40 | 4,37 | 13,60 | 13,90 | 7,97 | 1,23 | 4,08 | 1,84 |
| 18 | | | | | | | 763,00 | 1,24 | 4,69 | 13,70 | 14,00 | | | | |
| 19 | | | | | | | 739 | 0,81 | 3,78 | 13,60 | 14,20 | 8,55 | | | |
| 20 | | | 3,53 | 0,74 | 1,21 | 56,30 | 724,00 | 1,07 | 4,06 | 13,40 | 13,50 | 7,81 | 1,28 | 3,92 | 1,53 |
| 21 | | | | | | | | | | | | | | | |
| 22 | | | | | | | 712,00 | 0,79 | 5,34 | 13,40 | 13,90 | | 1,26 | 3,77 | 3,35 |
| 23 | | | | | | | | 1,39 | 5,87 | 13,70 | | | | | |
| 24 | | | | | | | | 1,75 | 5,90 | 13,70 | | | | | |
| 25 | 1,91 | | | | | | 737,00 | 0,30 | 3,32 | 13,34 | 12,87 | 8,04 | | | |
| 26 | | | | | | | | 1,56 | 5,80 | 13,80 | | | | | |
| 27 | | | | | | | 738,00 | 1,10 | 4,00 | 13,70 | 13,90 | | | | |
| 28 | | | | | | | 729,00 | 0,68 | 2,83 | 13,40 | | 7,85 | | 3,54 | 2,29 |
| 29 | | | | | | | | 1,03 | 3,94 | 13,80 | 13,70 | | | | |
| 30 | | | | | | | | 1,36 | 4,29 | 13,70 | | | | | |
| 31 | | | | | | | 721,73 | 1,43 | 6,37 | 13,80 | 13,80 | | | | |
| 32 | | | | | | | 720,00 | 1,20 | 7,60 | 13,50 | 13,60 | | | | |
| 33 | | | | | | | 730г/л | 1.10% | 8.90% | 13,60 | 13,90 | | | | |
| 34 | | | | | | | 725,00 | 1,46 | 8,24 | 13,70 | 14,00 | | | | |
| 35 | 2,12 | | 2,97 | 0,68 | 1,97 | | 735,00 | | | 13,13 | 13,40 | 6,88 | | 3,31 | 1,94 |
| 36 | | | | | | | 724,00 | 1,21 | 3,76 | 13,70 | | | | | |
| 37 | | | | | | | 723,00 | 1,12 | 3,62 | 13,70 | | 8,04 | | | |
| 38 | | | | | | | 720,00 | 1,50 | 4,10 | 13,90 | | 7,92 | 1,16 | 4,33 | 2,10 |
| 39 | | | | | | | 723,00 | 1,10 | 4,70 | 13,70 | | | | | |
| 40 | | | | | | | | 1,43 | 4,29 | 13,70 | | | | | |
| 41 | | | | | | | 724,00 | 1,32 | 4,63 | 13,80 | | | | | |
| 42 | | | | | | | 728,00 | 0,40 | 3,35 | 13,50 | 14,30 | 8,40 | 1,21 | 4,00 | 2,09 |
| 43 | | | | | | | 725,00 | | | 13,61 | 13,78 | 7,87 | | | |

# 7. Z SCORES

| Method | EN 16378:2013 | EN 16378:2013 | EN 16378:2013 | ISO 19942:2018 | ISO 19942:2018 | ISO 19942:2018 | ISO 19942:2018 | ISO 6540:1980/ ДСТУ ISO 6540:2007 | ISO 20483:2013/ ДСТУ ISO 20483:2016 | ISO 16634-2:2016 | ISO 12099:2017 | ISO 2171:2007/ ДСТУ ISO 2171:2009 | ISO 6492:1999/ ДСТУ ISO 6492:2003 | ISO 12099:2017 | ISO 6865:2000/ ДСТУ ISO 6865:2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory number | Broken grains, % | Grain impurities, % | Miscellaneous impurities, % | Broken grains, % | Damaged grains, % | Other grains, % | Miscellaneous impurities, % | Moisture content, % | Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25) | Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25) | Crude protein content, % (Expressed on dry matter, factor forconverting nitrogen content to protein content - 6.25) | Ash yield, % (Expressed on dry matter) | 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) |
| 1 | | | | | | | | | | | | | | | |
| 2 | 0,52 | -1,48 | -1,19 | | | | | -0,14 | | | | | | | |
| 3 | 0,60 | 0,61 | 0,98 | 0,82 | 0,35 | 0,20 | 1,26 | 0,58 | 0,35 | -0,26 | | -0,08 | -0,36 | | 0,42 |
| 4 | 0,39 | -0,31 | 0,30 | | | | | 0,07 | | | | | | | |
| 5 | 0,03 | -1,15 | 0,51 | | | | | -0,19 | | | | | | | |
| 6 | | | | | | | | | | | | | | | |
| 7 | -0,09 | 0,28 | -0,06 | -1,19 | -0,99 | -0,19 | 0,12 | 0,18 | 0,56 | 1,00 | 1,00 | -0,72 | 0,30 | | 1,66 |
| 8 | -0,13 | -0,99 | 0,33 | -0,67 | -1,83 | 0,01 | 0,27 | 0,07 | 0,56 | | | -0,72 | | | 2,12 |
| 9 | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | |
| 12 | 0,03 | 1,06 | 0,42 | -0,80 | 0,84 | 0,10 | 0,08 | 0,31 | -0,44 | | 0,01 | 1,18 | 1,67 | 1,99 | -0,55 |
| 13 | 0,88 | 0,94 | 1,01 | 0,56 | -1,39 | -0,39 | 2,98 | 0,90 | | | -0,12 | | | 0,67 | |
| 14 | 0,03 | 1,51 | -0,71 | 1,34 | 1,16 | 0,50 | 0,31 | 0,50 | | | | | | | |
| 15 | 0,68 | -0,25 | -0,66 | 1,28 | 0,48 | 0,01 | -1,26 | 0,05 | -0,22 | | | -0,51 | -1,44 | | -0,55 |
| 16 | 0,96 | -0,05 | -0,89 | 0,43 | 0,32 | 0,20 | -0,95 | 0,21 | -0,51 | | | -1,56 | -1,59 | | -0,37 |
| 17 | -0,34 | 1,08 | -0,27 | -0,93 | 1,26 | 2,95 | -0,11 | -0,46 | 0,85 | | | 0,55 | 0,88 | | -1,24 |
| 18 | 2,10 | 2,31 | -0,48 | | | | | -1,07 | | | | | | | |
| 19 | | | | | | | | -0,19 | | | | | 2,54 | | 0,34 |
| 20 | -0,34 | 1,06 | -0,66 | 0,50 | 0,14 | -1,07 | -0,53 | -0,19 | -1,15 | | -0,74 | 0,76 | 0,73 | -1,00 | -1,56 |
| 21 | -1,92 | -1,01 | | | -1,20 | -0,19 | | -0,67 | 0,42 | | | 0,34 | 0,01 | | 0,88 |
| 22 | | | | | | | | | 0,35 | | | | | | |
| 23 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |
| 25 | | | | | | | | -0,78 | 0,14 | -0,74 | 1,96 | -0,93 | 0,37 | -0,74 | -0,09 |
| 26 | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | |
| 35 | -0,58 | -1,71 | 0,03 | | | | | -0,83 | -9,79 | | -3,44 | | -1,52 | -0,74 | 0,14 |
| 36 | -0,87 | -0,50 | 0,24 | | | | | 0,21 | -0,01 | | | -0,51 | -0,36 | | 0,83 |
| 37 | -0,78 | -0,76 | 0,03 | -1,32 | 0,53 | -0,19 | -0,19 | 0,39 | 0,28 | | | 0,34 | 0,01 | | 0,56 |
| 38 | -1,19 | -0,05 | 1,28 | | | | | 0,45 | -0,65 | | | -0,93 | 0,66 | | -0,92 |
| 39 | | | | | | | | -0,11 | | | | | | | |
| 40 | | | | | | | | | | | | | | | |
| 41 | | | | | | | | 0,39 | | | | | | | |
| 42 | | | | | | | | -0,35 | 0,14 | | | | -0,79 | | -0,69 |
| 43 | | | | | | | | | | | | | | | |

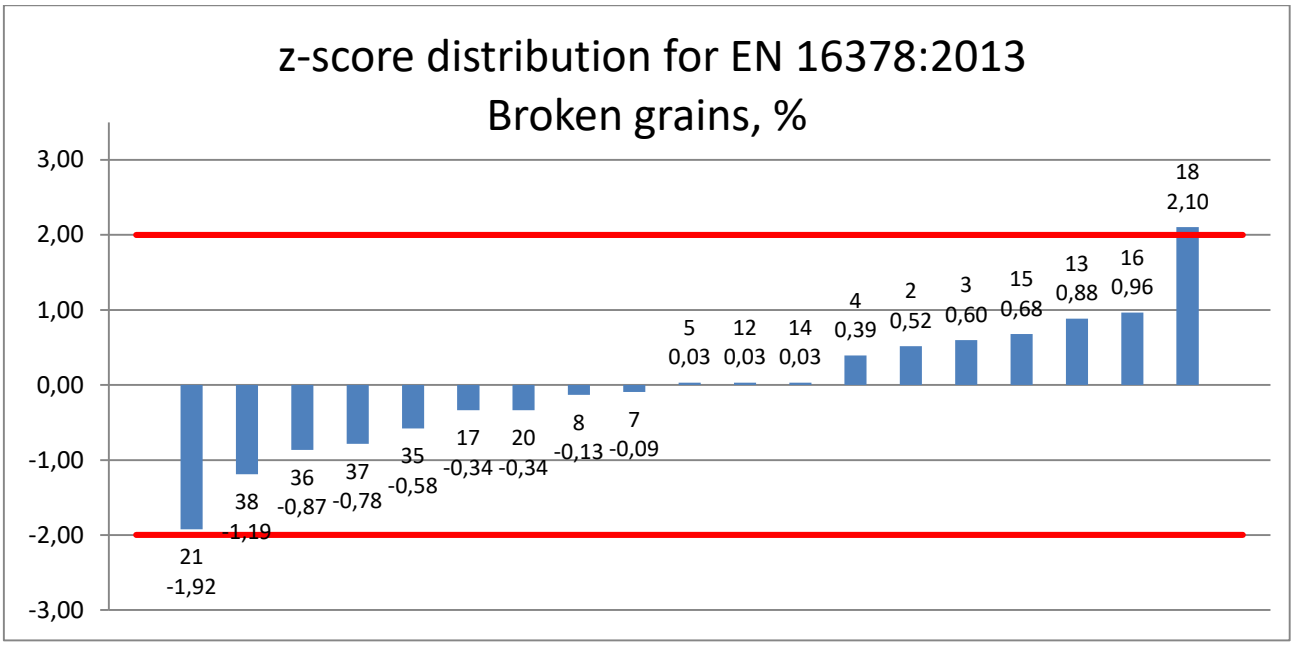
| Method | ISO 12099:2017 | GAFTA 7.0:2018 | USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) | USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) | USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) | USDA (Grain Grading Procedures, Chapter 1 - General Information, September 1, 2018) | ДСТУ ГОСТ 10840:2019 (ГОСТ 10840–2017, IDT) | ГОСТ 30483-97/ ДСТУ 4525:2006 | ГОСТ 30483-97/ ДСТУ 4525:2006 | ГОСТ 13586.5-93 | ДСТУ 4117:2007 | ДСТУ 7169:2010 | ГОСТ 10847-74 | ГОСТ 13496.15-97 | ГОСТ 13496.2-91 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory number | Crude fibre content, % (Expressed as a mass fraction of the product as received) | Volatile nitrogenous basis, % | Broken Corn, % | Foreign Material, % | Damaged kernels, % | Test weight, lbu/bu | Test weight, g/l | Foreign impurities, % | Grain impurities, % | Moisture content, % | Moisture content, % | Mass fraction of crude protein, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.0) | Ash content, % (Expressed on dry matter) | Mass fraction of crude fat, % (Expressed on dry matter) | Mass fraction of crude fibre, % (Expressed on dry matter) |
| 1 | | | | | | | 2,14 | -0,05 | -0,13 | 0,29 | 0,57 | | | | |
| 2 | | | | | | | | -0,29 | -0,19 | 0,02 | | | | | |
| 3 | | -0,48 | -0,57 | 0,71 | 2,70 | -0,66 | -0,18 | 0,95 | 0,01 | 0,67 | | 0,22 | -0,78 | 1,12 | 0,40 |
| 4 | | | -0,24 | 1,55 | 0,10 | -0,76 | -0,51 | -0,02 | -0,72 | -0,25 | 0,04 | | | | |
| 5 | | | | | | | -0,68 | -0,59 | -0,99 | 0,56 | 0,30 | | | | |
| 6 | | | | | | | | -0,15 | 1,23 | 0,02 | | | | | |
| 7 | | -0,67 | -1,26 | 0,34 | -0,70 | -0,95 | -1,01 | -0,65 | -0,53 | 0,15 | | 0,61 | -0,36 | -1,50 | -0,48 |
| 8 | | | -0,61 | 1,27 | -0,75 | -0,90 | -1,01 | -0,65 | -0,51 | -0,12 | -0,36 | 0,95 | -0,36 | -1,50 | -0,48 |
| 9 | | | | | | | | -0,32 | -0,48 | 0,56 | 0,04 | | | | |
| 10 | | | | | | | | | | | | -0,10 | | -1,50 | -0,17 |
| 11 | | | | | | | -0,68 | 0,28 | -0,30 | 0,02 | 0,04 | | | | |
| 12 | | 1,15 | 1,43 | -0,69 | 1,37 | 1,26 | -0,68 | 0,15 | -0,16 | -0,23 | 0,30 | -0,63 | 1,74 | 3,19 | -0,03 |
| 13 | | | 1,23 | -0,50 | 0,91 | 1,12 | 0,48 | 0,68 | 0,45 | 0,83 | 0,71 | | | | |
| 14 | | | | | | | 1,31 | -0,22 | 0,34 | 0,29 | | | | | |
| 15 | | | 0,49 | 0,34 | -1,05 | 0,76 | -0,68 | | | 0,02 | | | | | |
| 16 | | | 0,17 | -0,31 | -0,93 | 0,83 | -0,84 | | | 0,26 | | | | | |
| 17 | | | | | | | 1,31 | 0,68 | -0,04 | -0,25 | 0,04 | -0,12 | 0,06 | 1,76 | -0,23 |
| 18 | | | | | | | 6,12 | 0,15 | 0,28 | 0,02 | 0,30 | | | | |
| 19 | | | | | | | 2,14 | -1,29 | -0,63 | -0,25 | 0,84 | 2,36 | | | |
| 20 | | | 0,82 | -1,15 | -0,91 | -0,69 | -0,35 | -0,42 | -0,35 | -0,79 | -1,03 | -0,80 | 1,11 | 0,49 | -0,78 |
| 21 | | | | | | | | | | | | | | | |
| 22 | | | | | | | -2,34 | -1,35 | 0,93 | -0,79 | 0,04 | | 0,69 | -0,70 | 2,48 |
| 23 | | | | | | | | 0,65 | 1,46 | 0,02 | | | | | |
| 24 | | | | | | | | 1,85 | 1,49 | 0,02 | | | | | |
| 25 | -1,45 | | | | | | 1,81 | -2,99 | -1,09 | -0,96 | -2,72 | 0,18 | | | |
| 26 | | | | | | | | 1,21 | 1,39 | 0,29 | | | | | |
| 27 | | | | | | | 1,97 | -0,32 | -0,41 | 0,02 | 0,04 | | | | |
| 28 | | | | | | | 0,48 | -1,72 | -1,58 | -0,79 | | -0,61 | | -2,50 | 0,57 |
| 29 | | | | | | | | -0,55 | -0,47 | 0,29 | -0,50 | | | | |
| 30 | | | | | | | | 0,55 | -0,12 | 0,02 | | | | | |
| 31 | | | | | | | -0,72 | 0,78 | 1,96 | 0,29 | -0,23 | | | | |
| 32 | | | | | | | -1,01 | 0,01 | 3,19 | -0,52 | -0,77 | | | | |
| 33 | | | | | | | 0,65 | -0,32 | 4,49 | -0,25 | 0,04 | | | | |
| 34 | | | | | | | -0,18 | 0,88 | 3,83 | 0,02 | 0,30 | | | | |
| 35 | 1,45 | | -1,47 | -1,71 | 0,44 | | 1,48 | | | -1,53 | -1,30 | -4,78 | | -4,35 | -0,05 |
| 36 | | | | | | | -0,35 | 0,05 | -0,65 | 0,02 | | | | | |
| 37 | | | | | | | -0,51 | -0,25 | -0,79 | 0,02 | | 0,18 | | | |
| 38 | | | | | | | -1,01 | 1,01 | -0,31 | 0,56 | | -0,33 | -1,41 | 3,74 | 0,24 |
| 39 | | | | | | | -0,51 | -0,32 | 0,29 | 0,02 | | | | | |
| 40 | | | | | | | | 0,78 | -0,12 | 0,02 | | | | | |
| 41 | | | | | | | -0,35 | 0,41 | 0,22 | 0,29 | | | | | |
| 42 | | | | | | | 0,32 | -2,65 | -1,06 | -0,52 | 1,11 | 1,72 | -0,36 | 1,12 | 0,22 |
| 43 | | | | | | | -0,18 | | | -0,23 | -0,28 | -0,55 | | | |

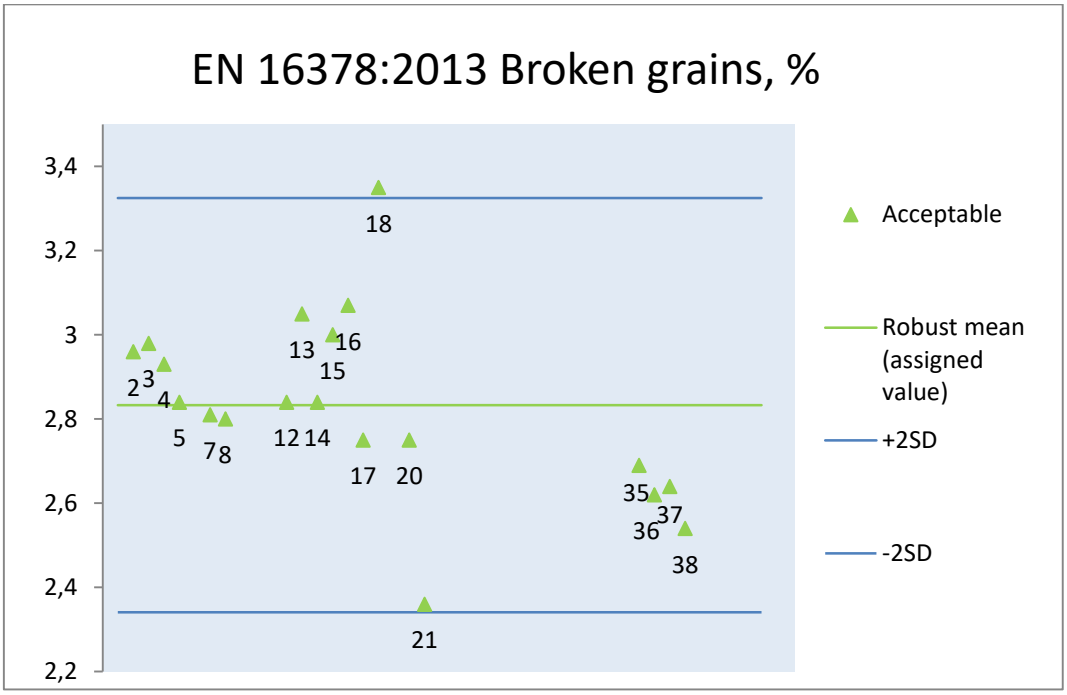
**Remarks**

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

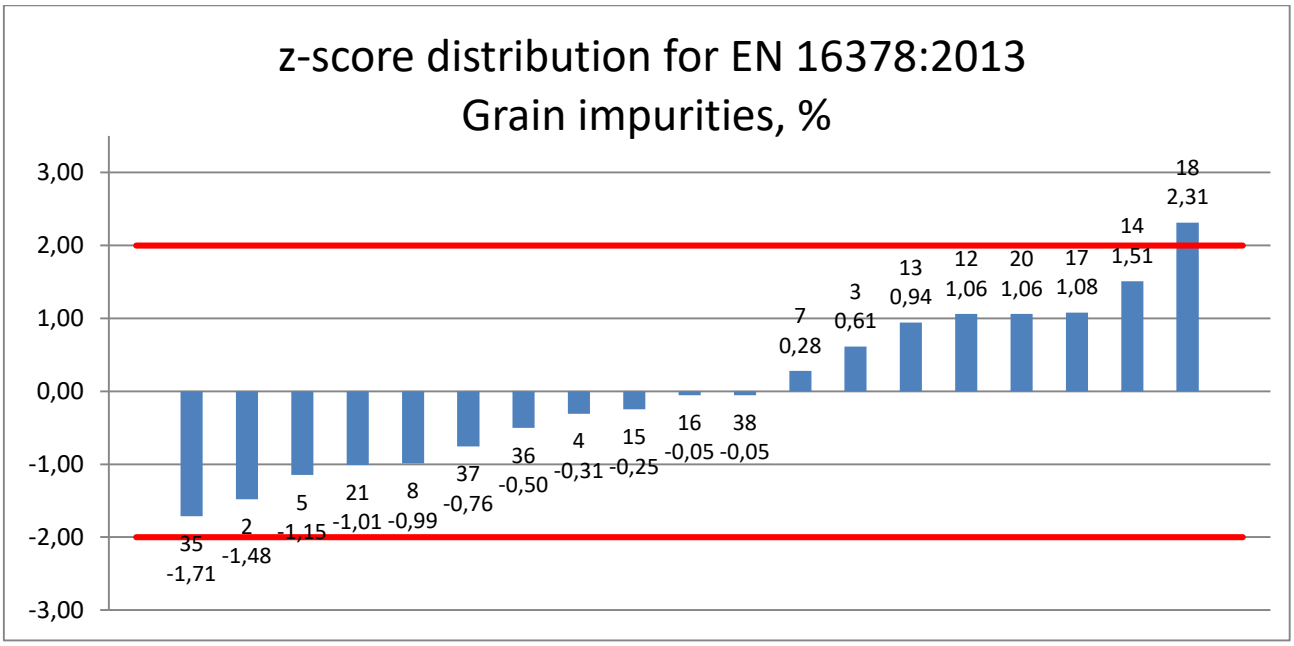
## 8. Z SCORE PLOTS AND RESULTS CHARTS.

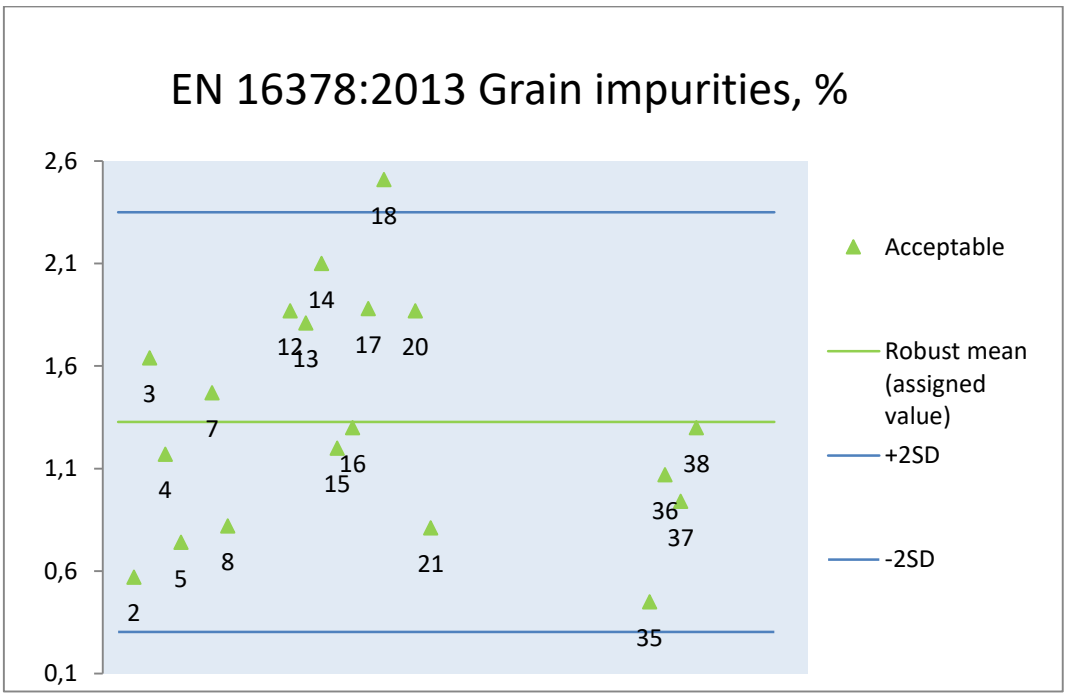
### 8.1. EN 16378:2013 Broken grains, %



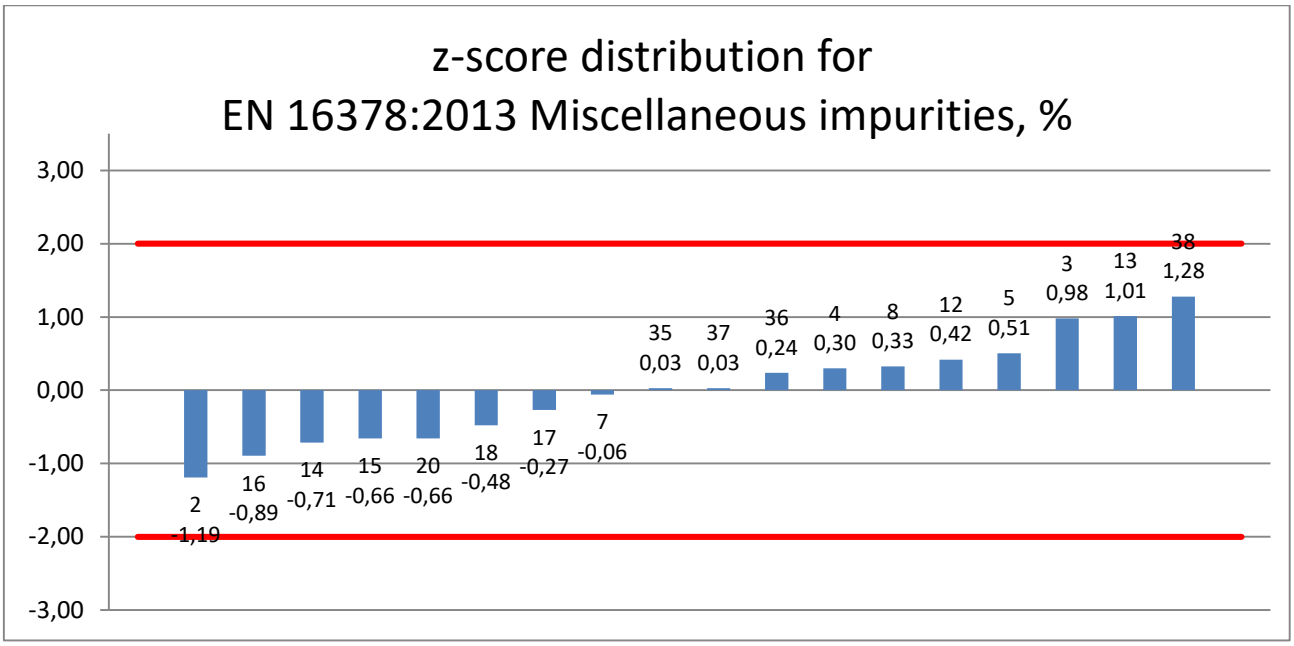



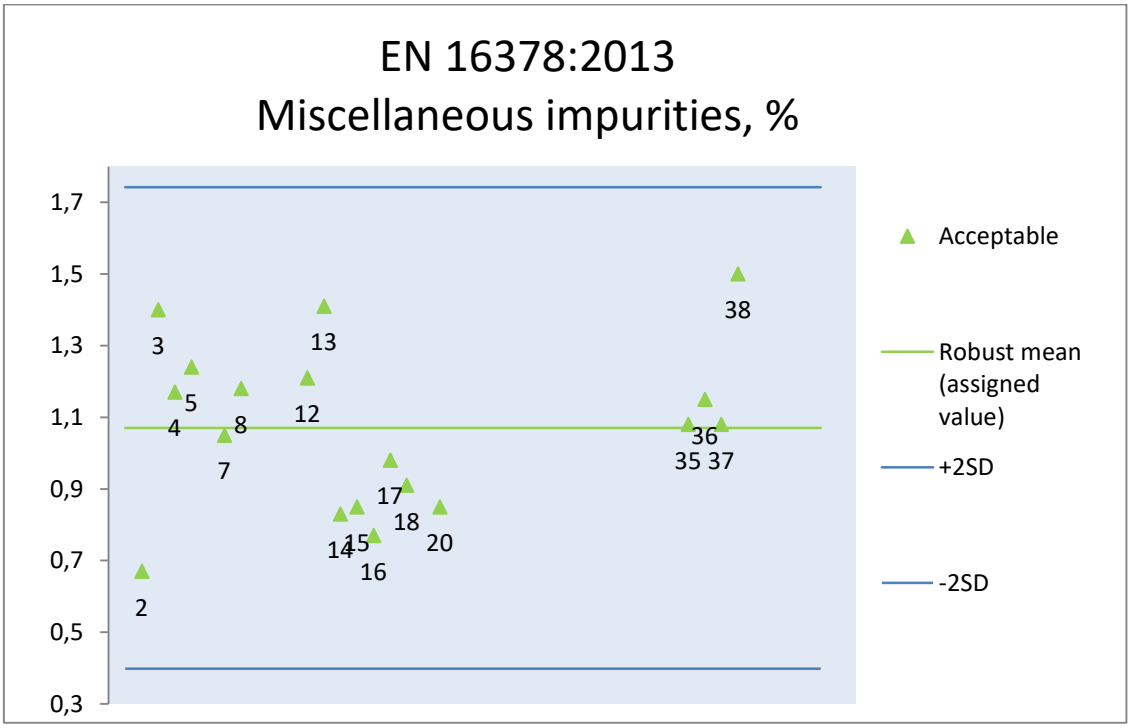
## 8.2. EN 16378:2013 Grain impurities, %



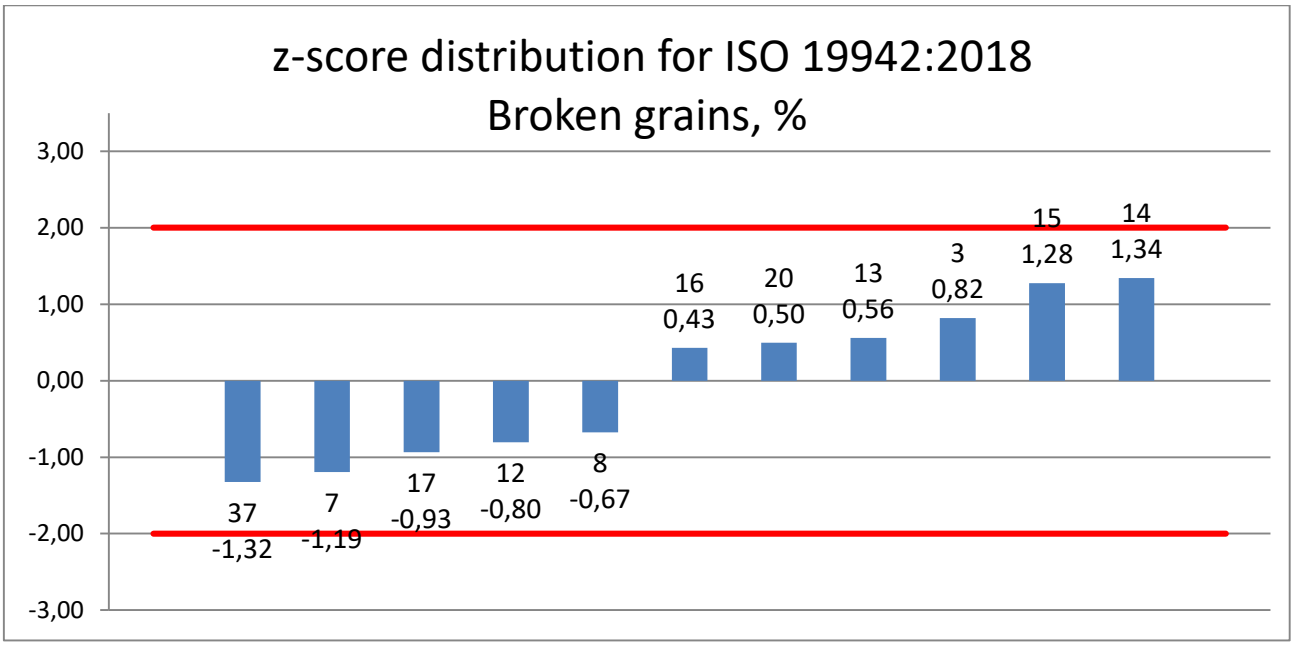



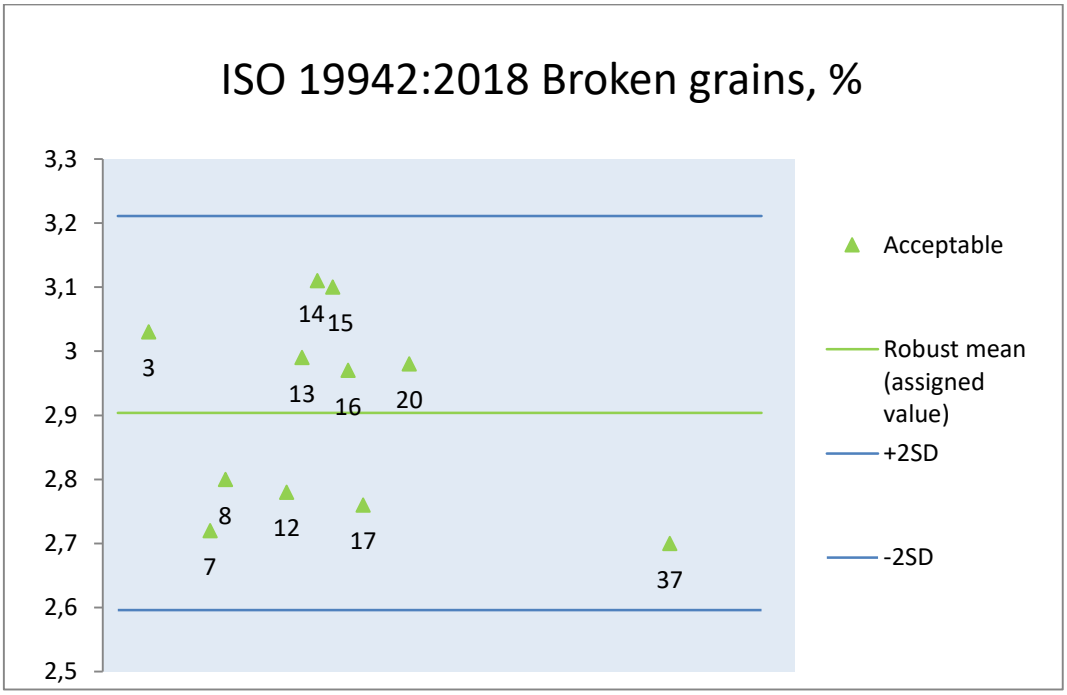
## 8.3. EN 16378:2013 Miscellaneous impurities, %



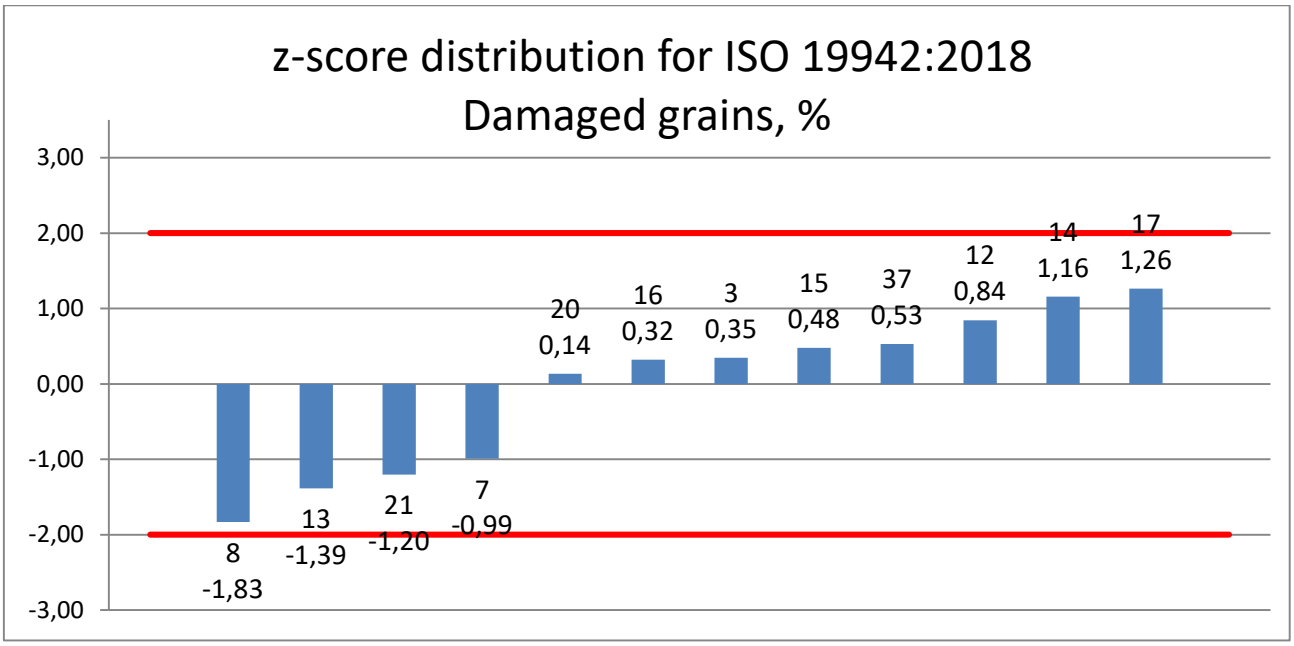



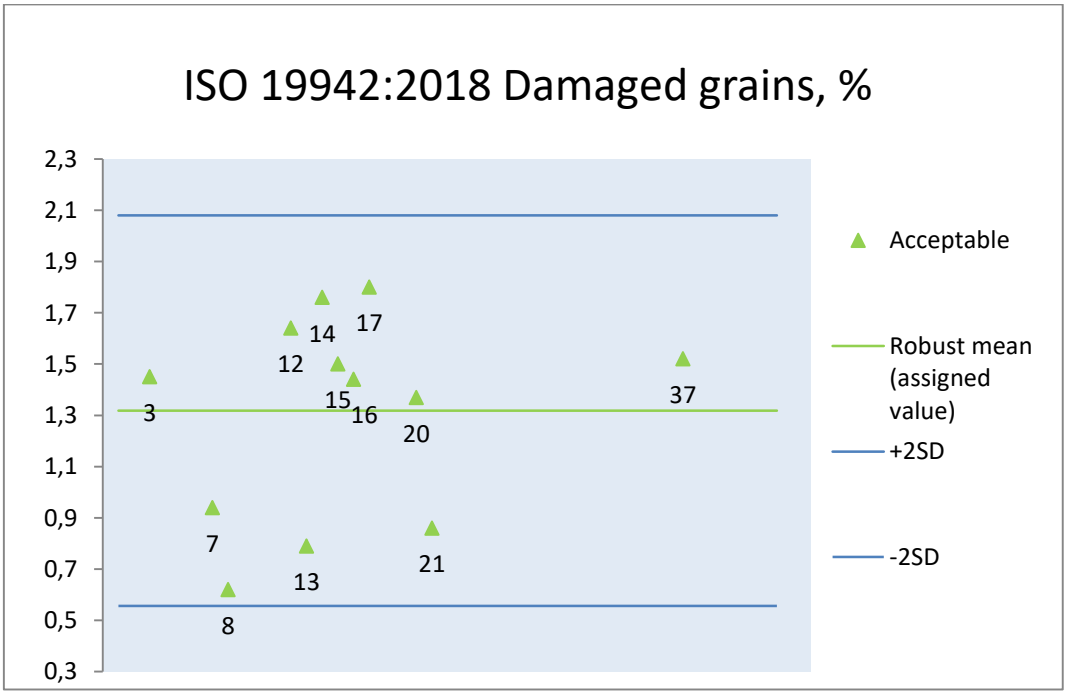
## 8.4. ISO 19942:2018 Broken grains, %



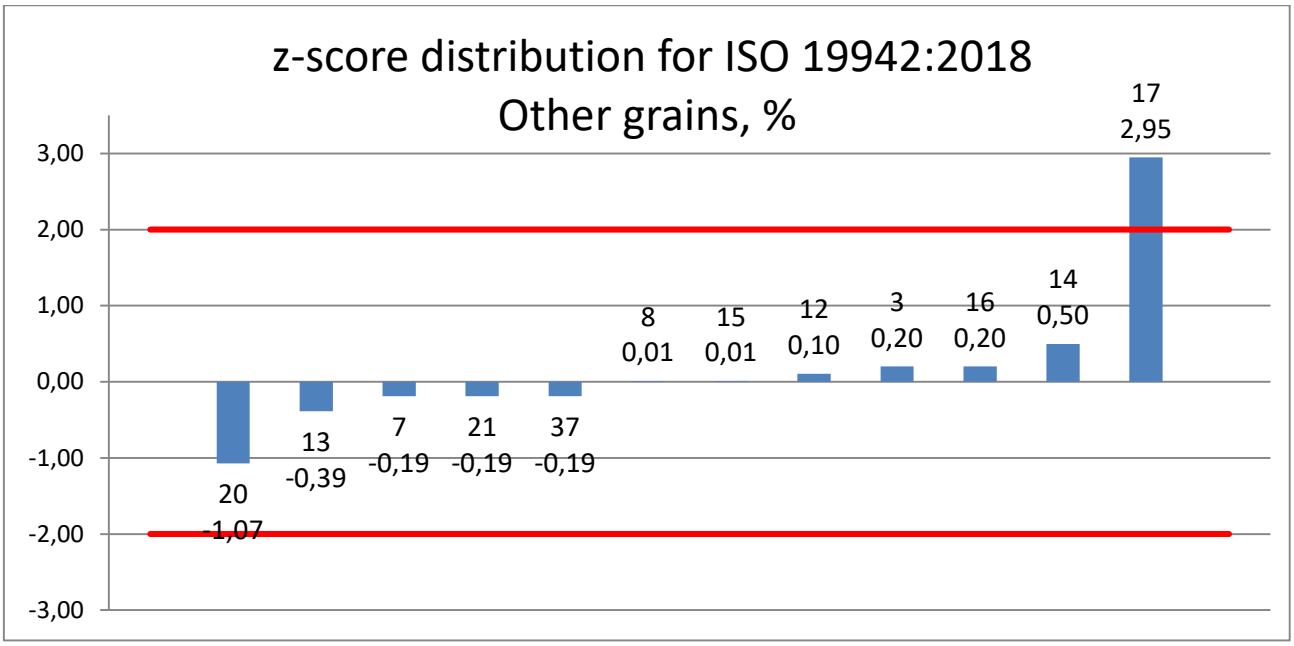



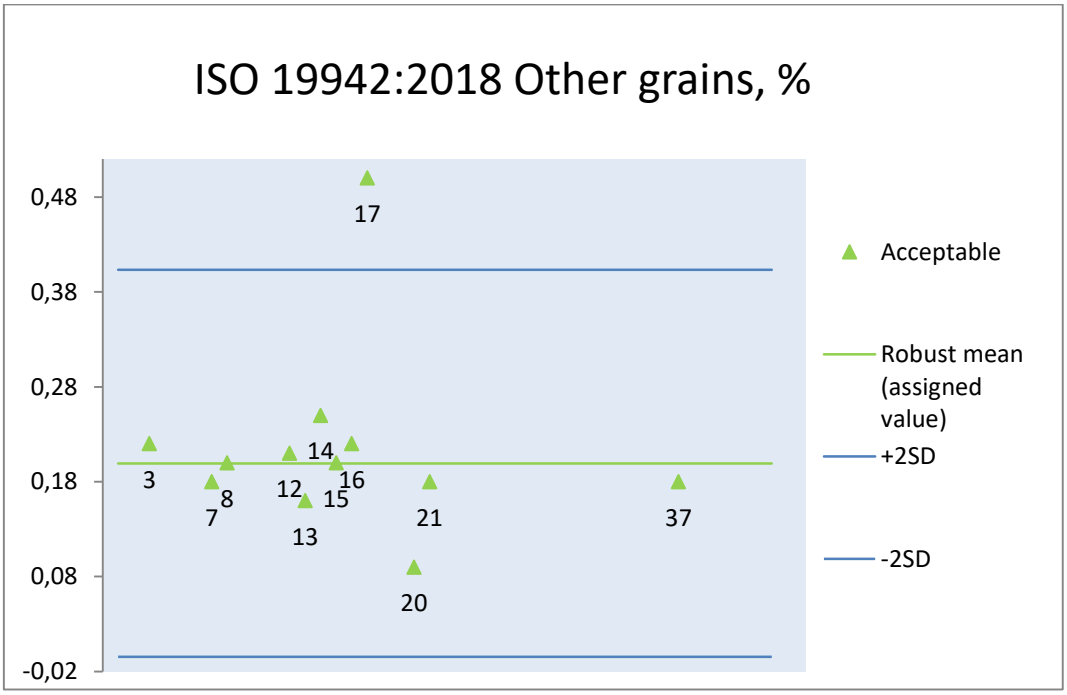
## 8.5. ISO 19942:2018 Damaged grains, %



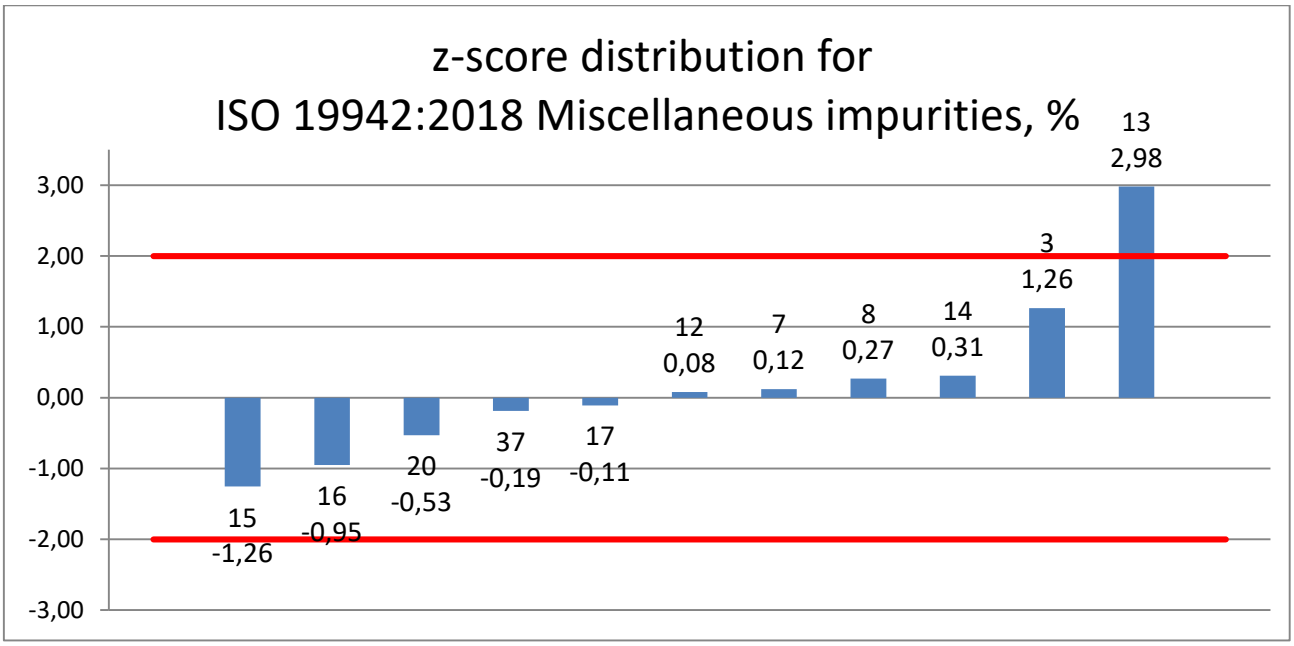



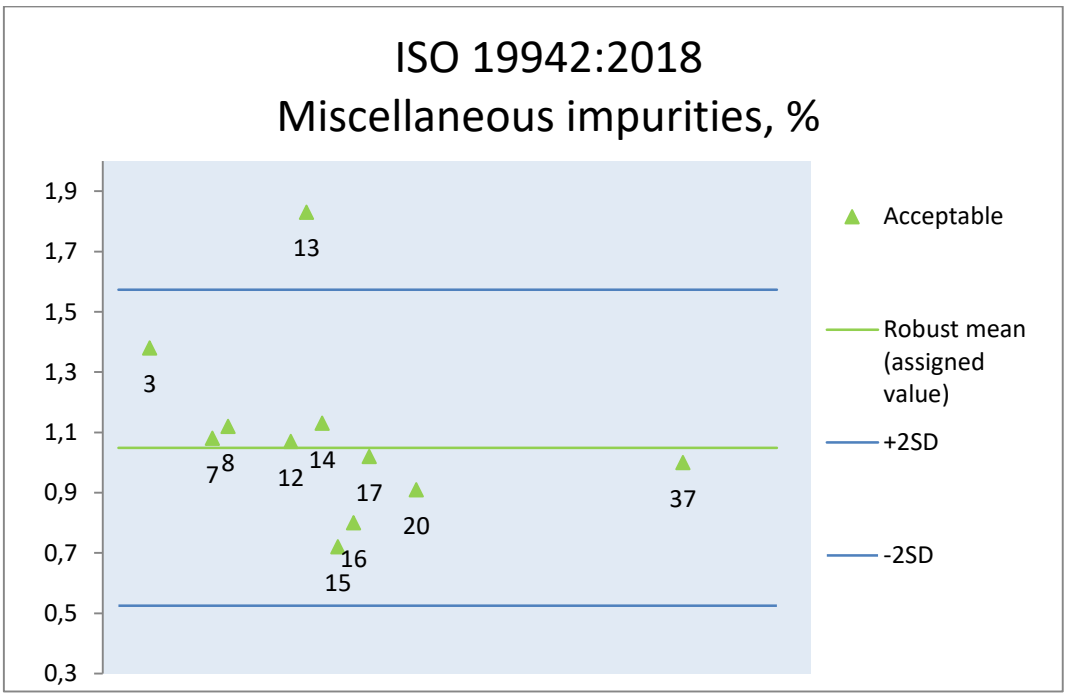
## 8.6. ISO 19942:2018 Other grains, %



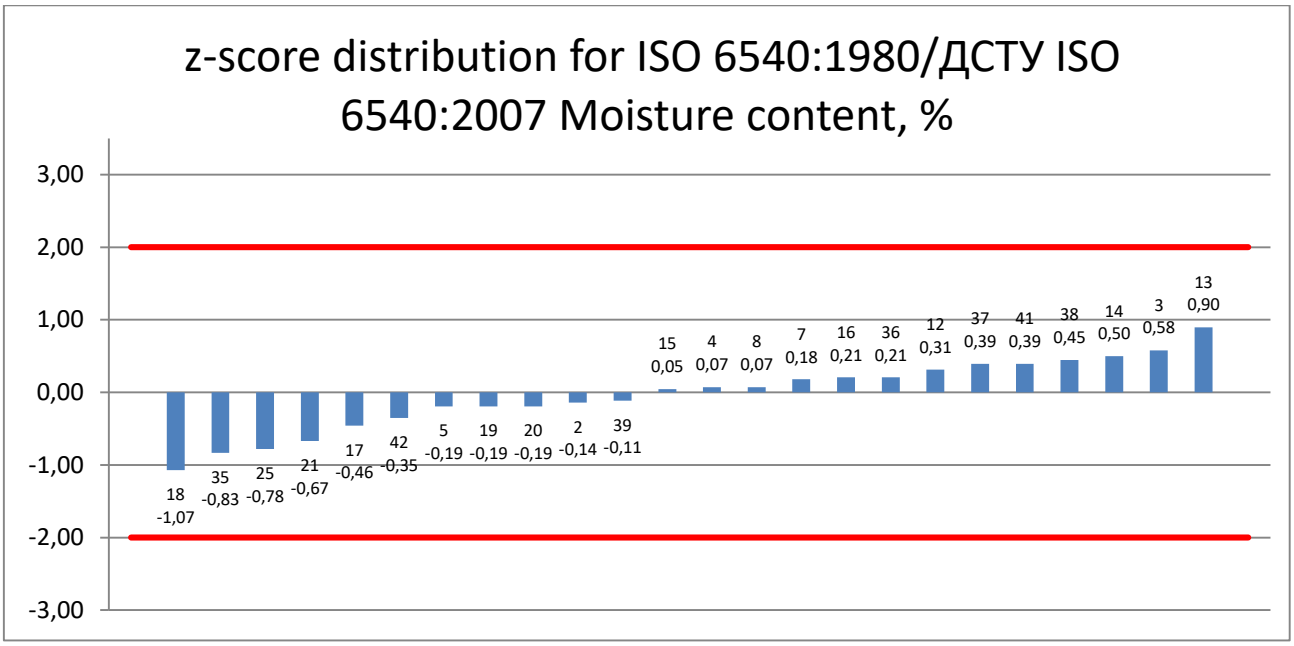



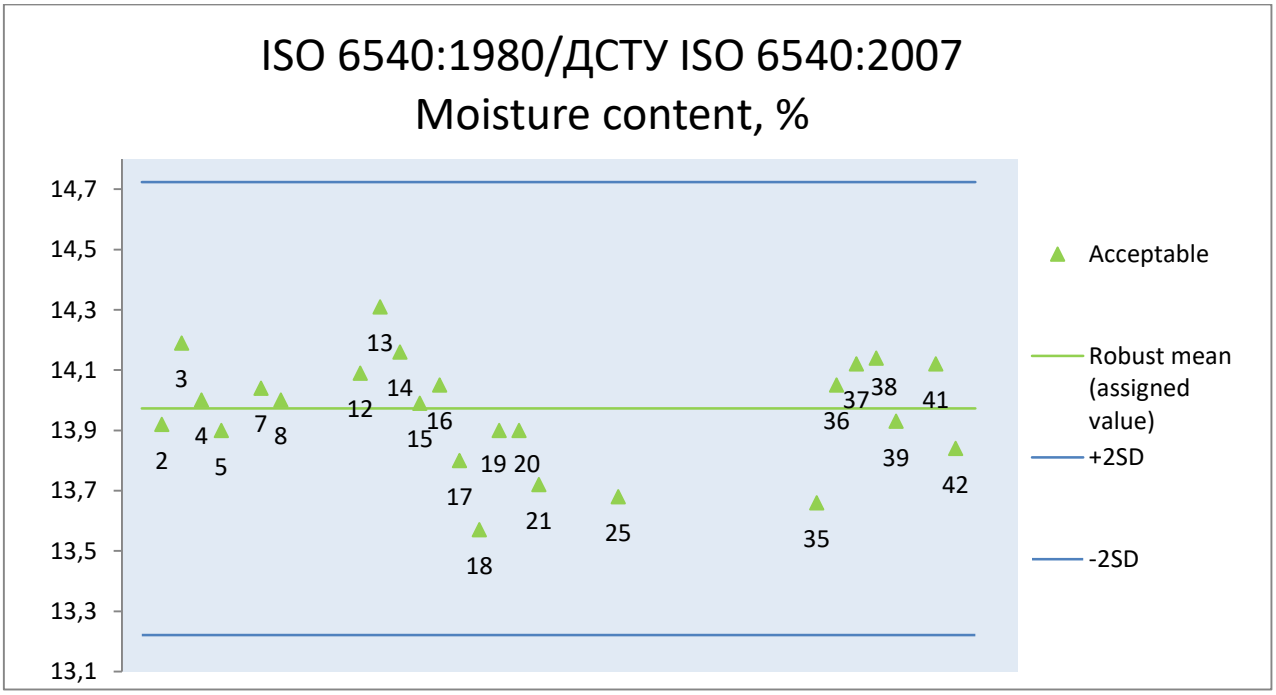
## 8.7. ISO 19942:2018 Miscellaneous impurities, %



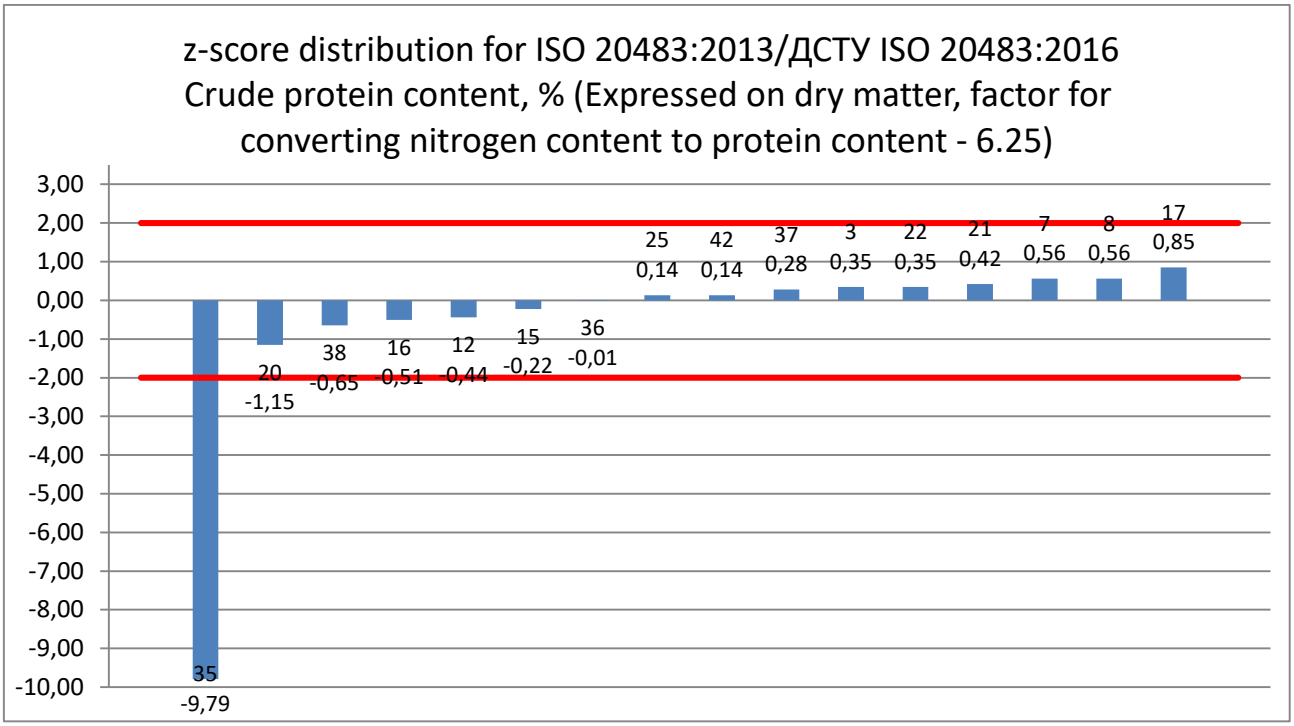



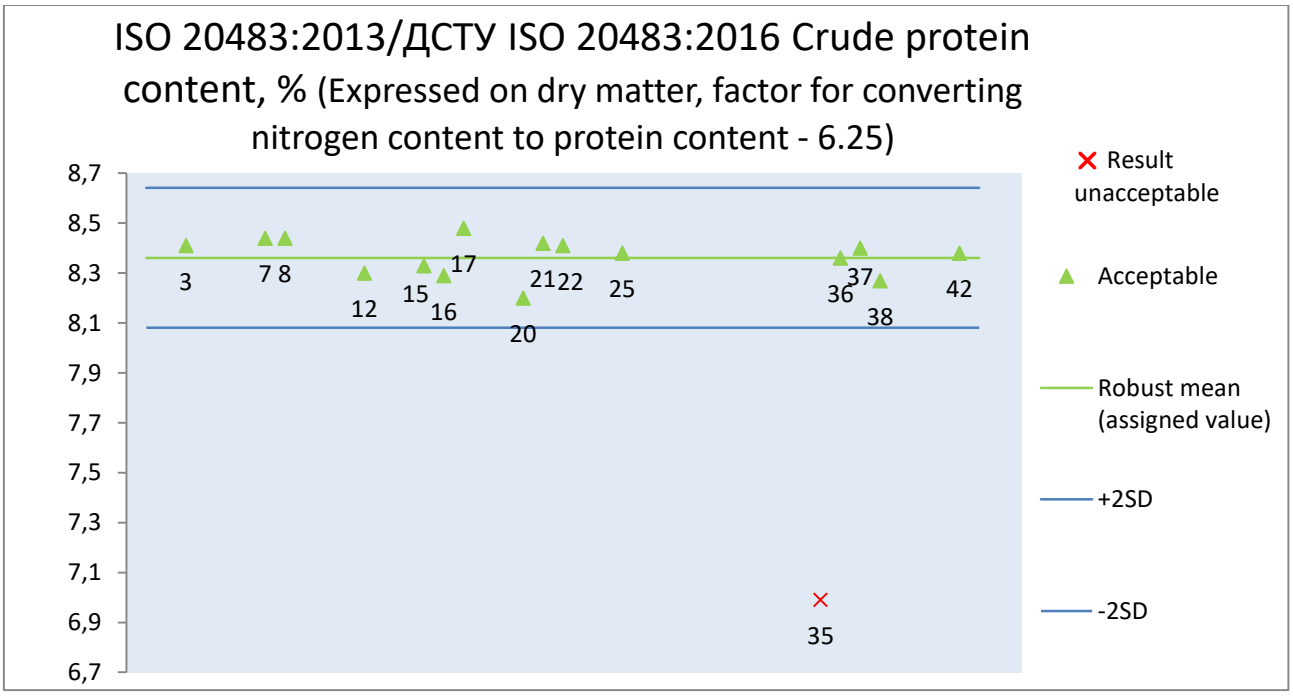
## 8.8. ISO 6540:1980/ ДСТУ ISO 6540:2007 Moisture content, %



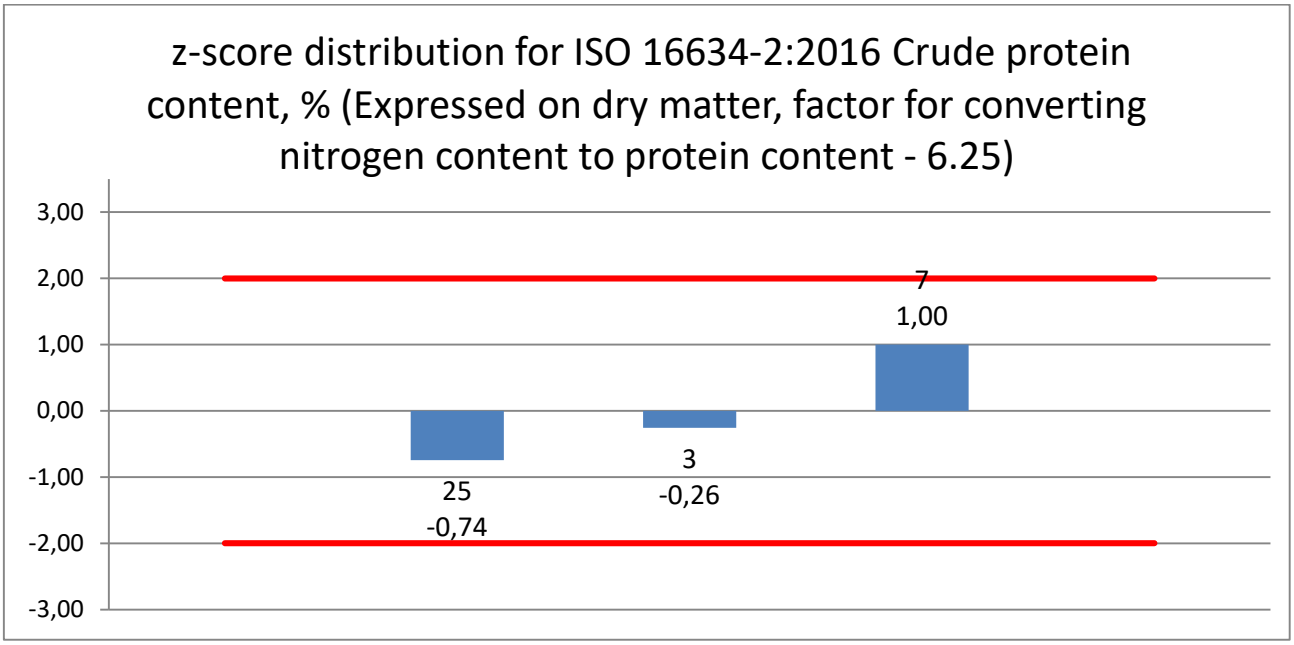



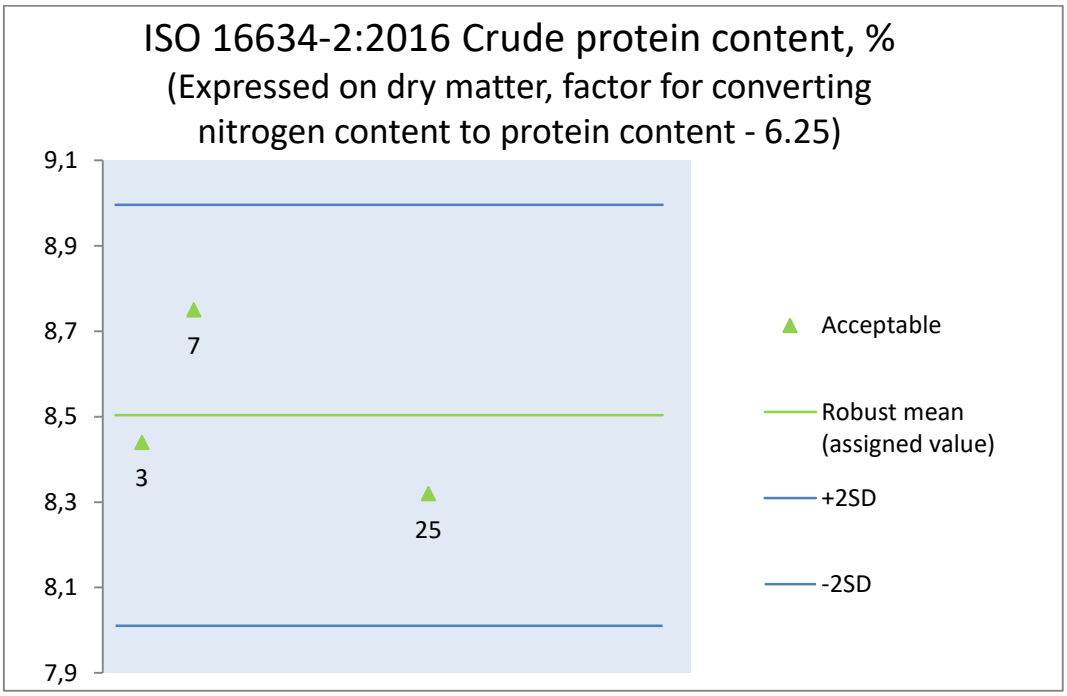
## 8.9. ISO 20483:2013/ ДСТУ ISO 20483:2016 Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25)



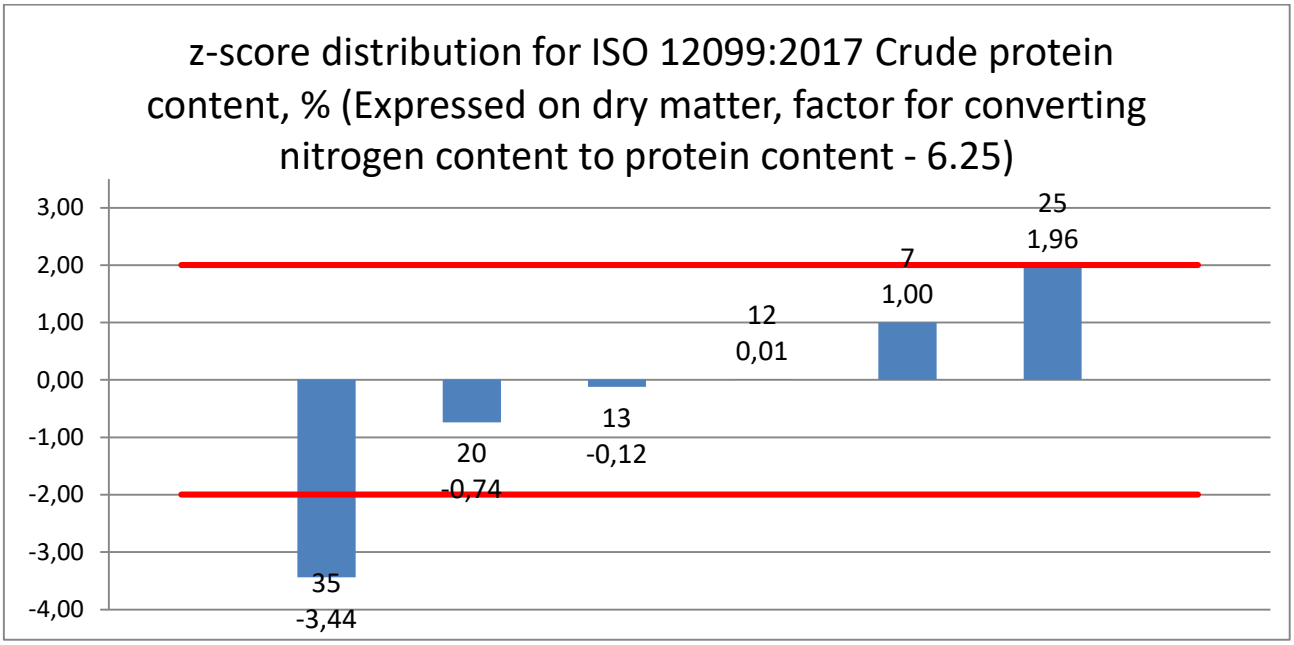



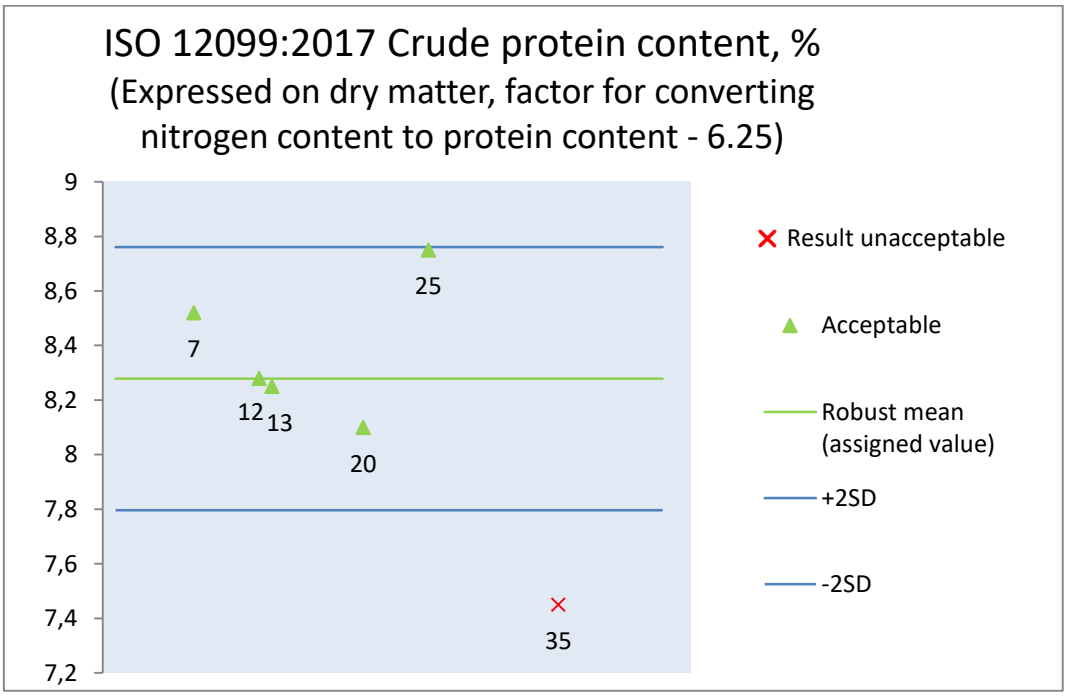
## 8.10. ISO 16634-2:2016 Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25)



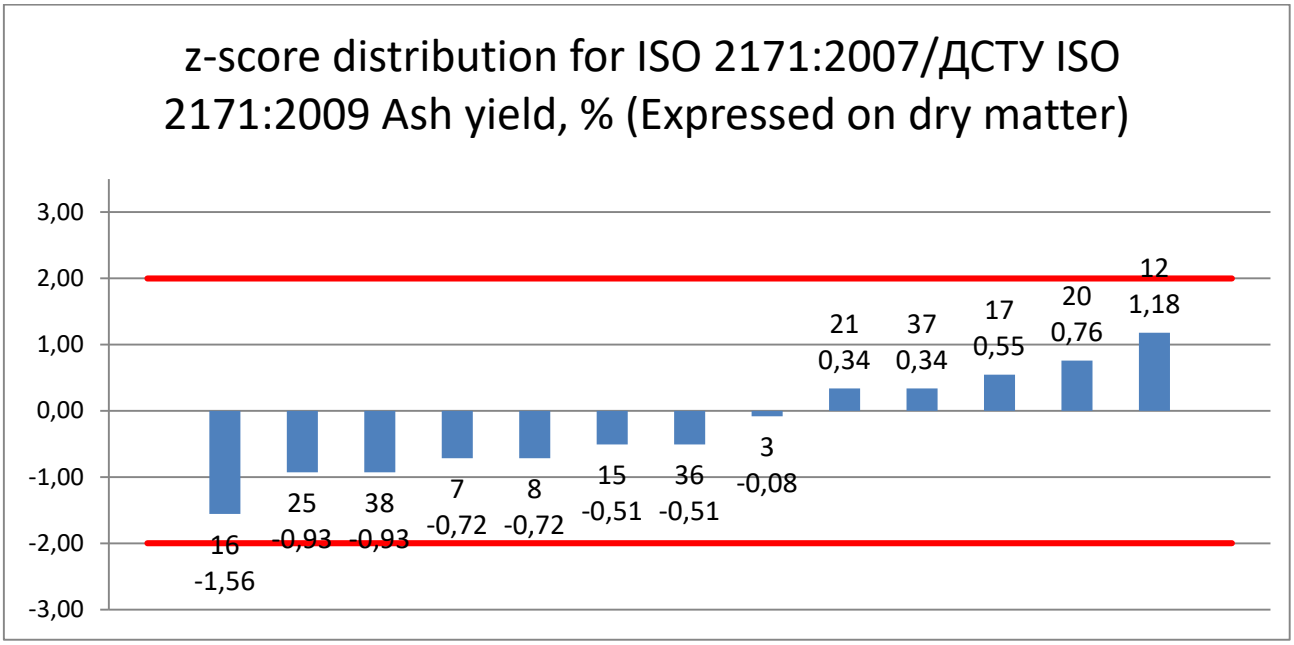



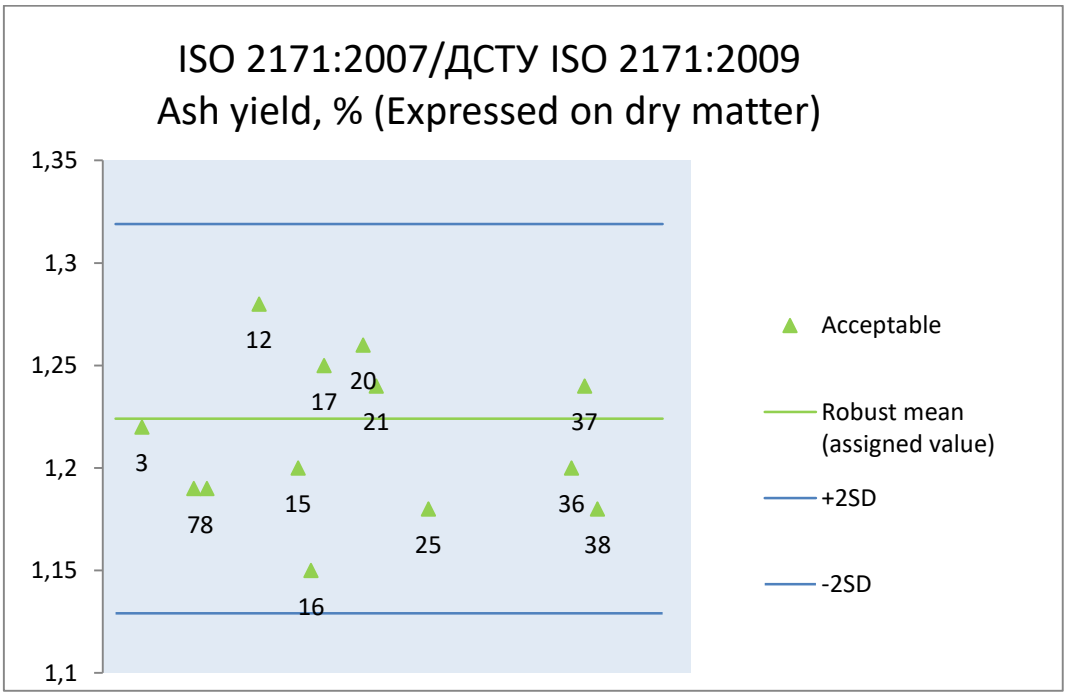
## 8.11. ISO 12099:2017 Crude protein content, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.25)



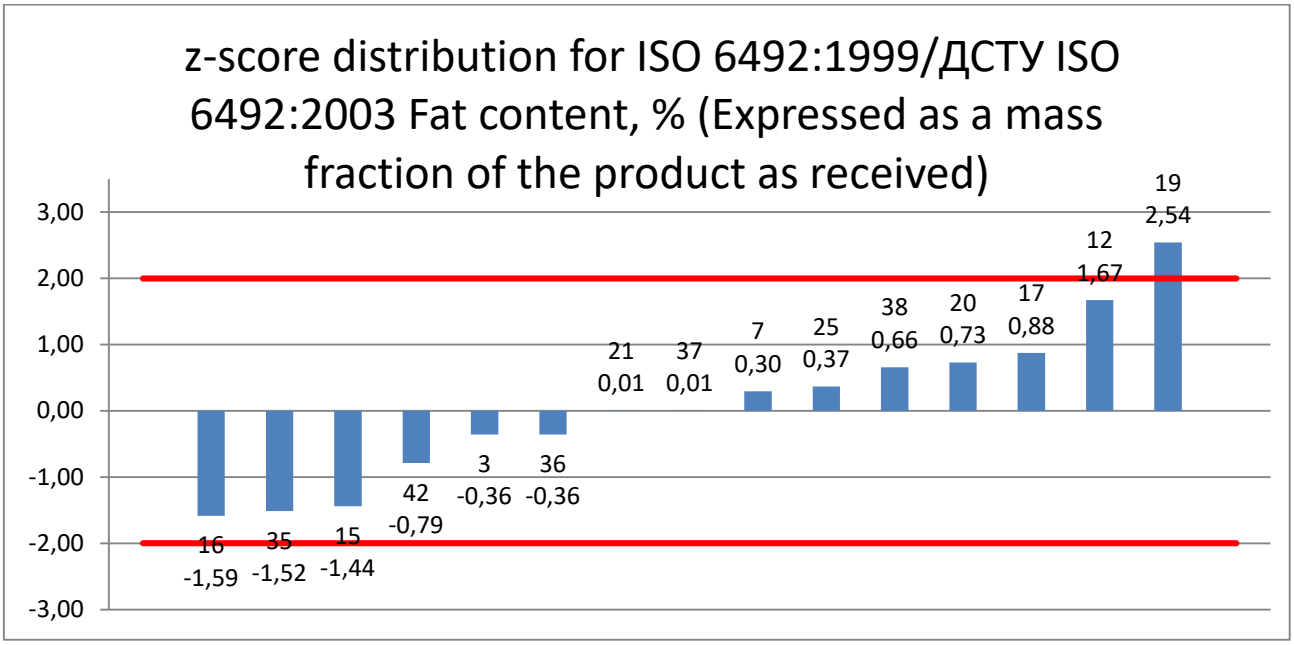



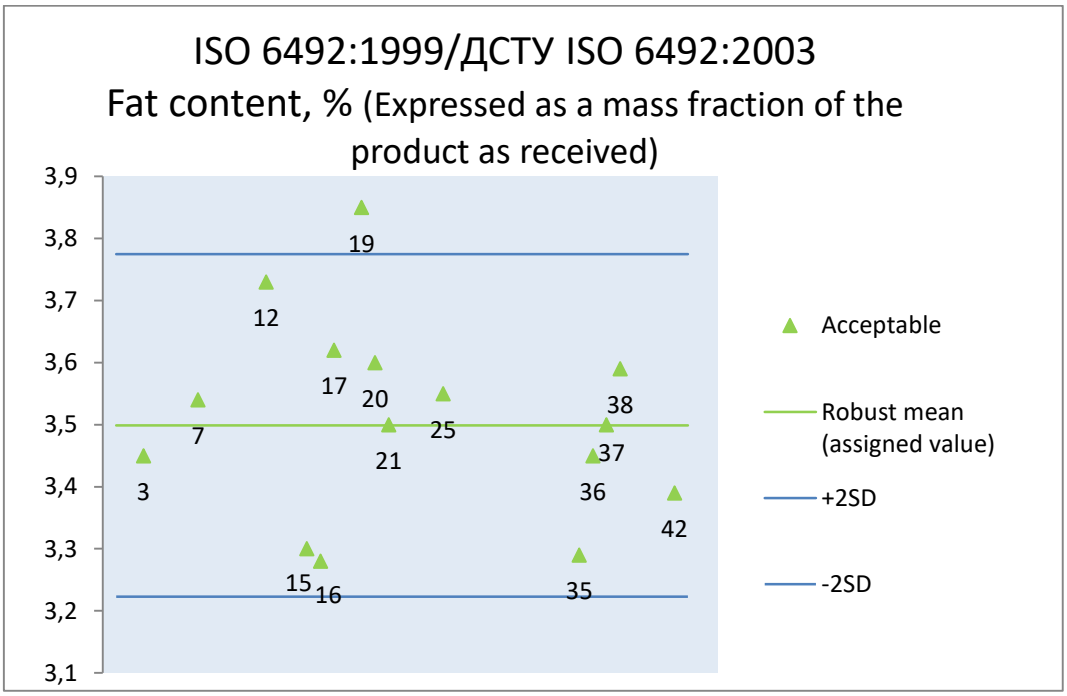
**8.12. ISO 2171:2007/ ДСТУ ISO 2171:2009 Ash yield, % (Expressed on dry matter)**



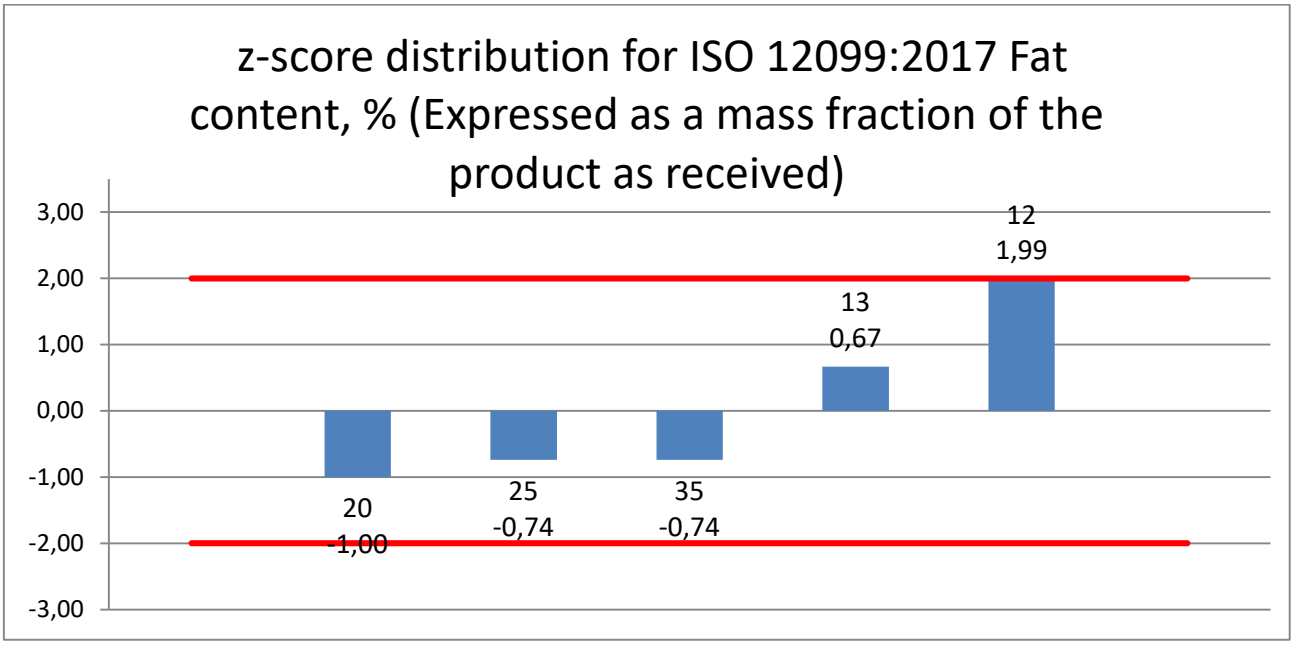



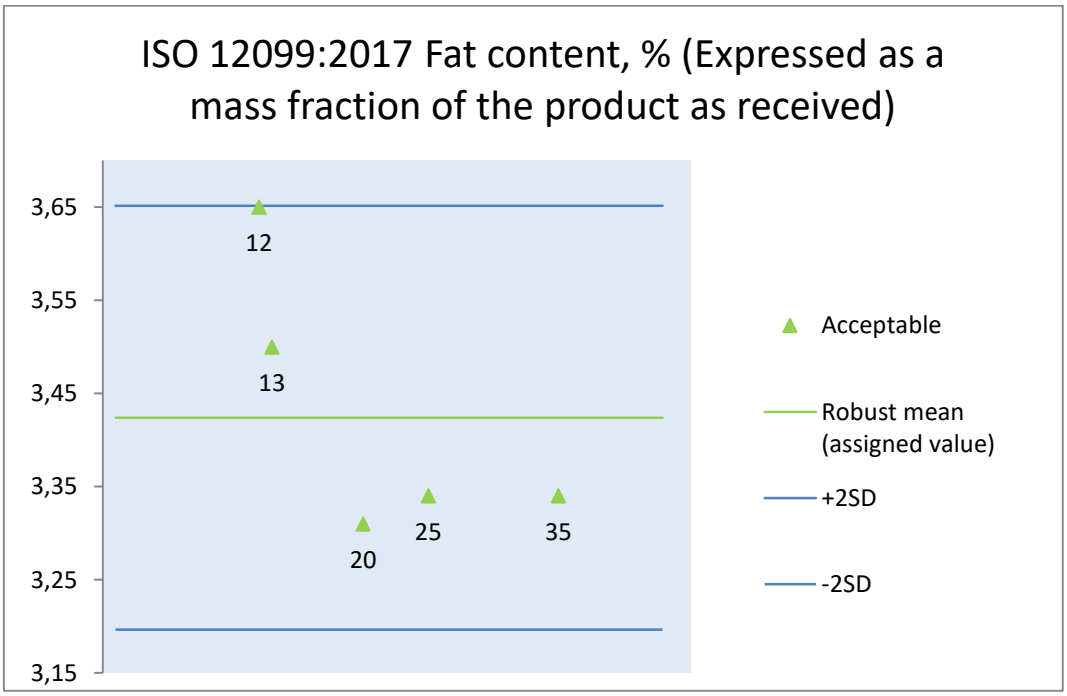
## 8.13. ISO 6492:1999/ ДСТУ ISO 6492:2003 Fat content, % (Expressed as a mass fraction of the product as received)



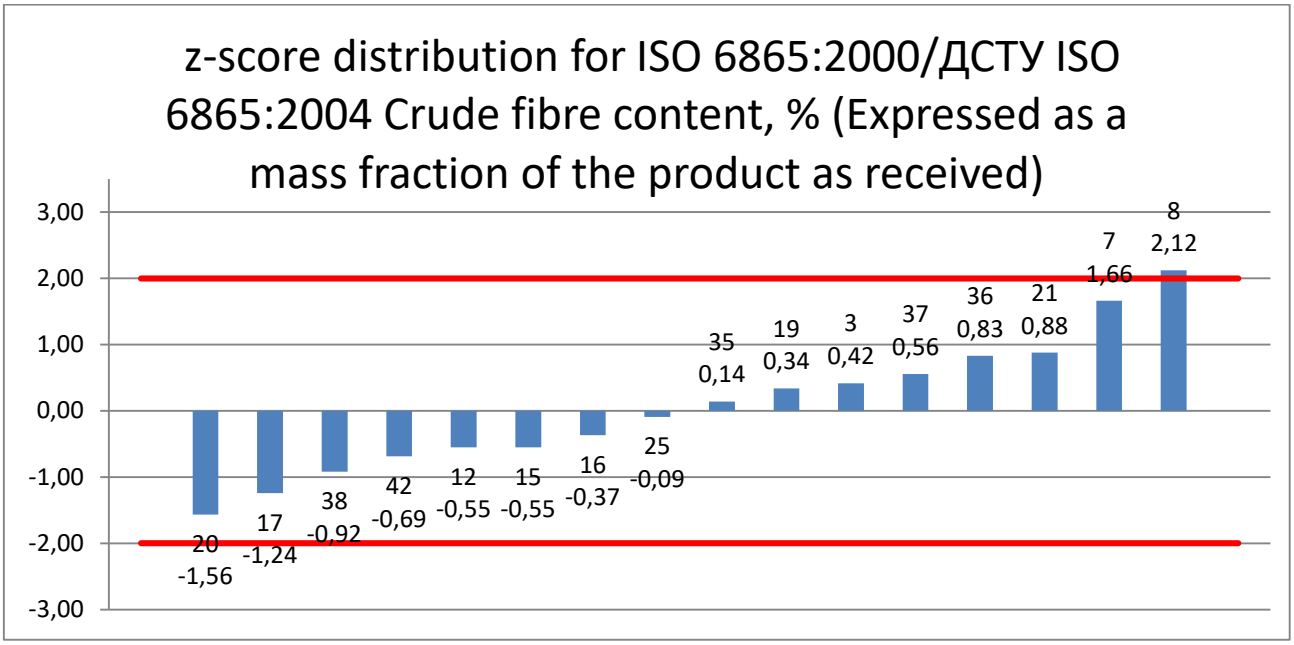



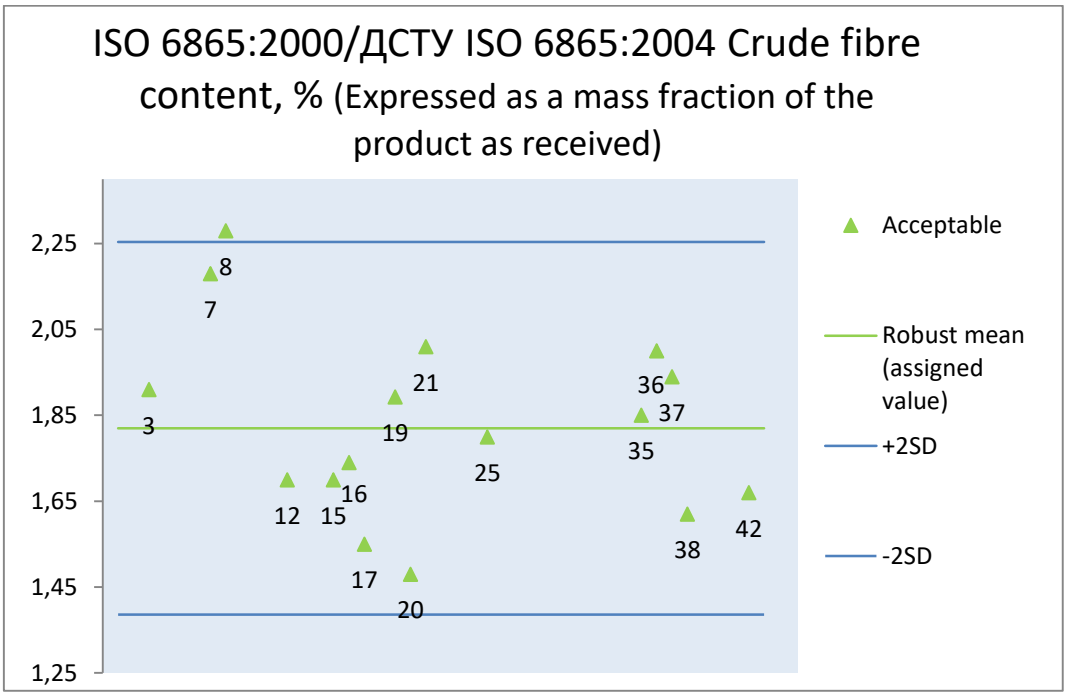
## 8.14. ISO 12099:2017 Fat content, % (Expressed as a mass fraction of the product as received)



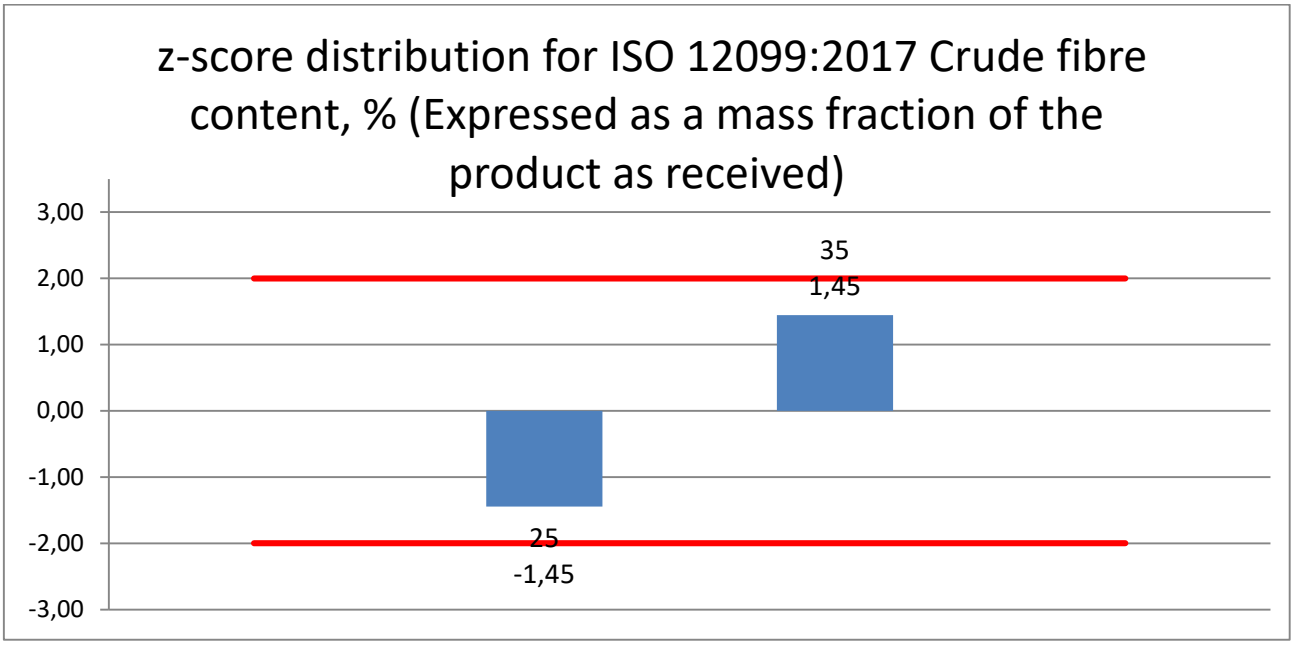



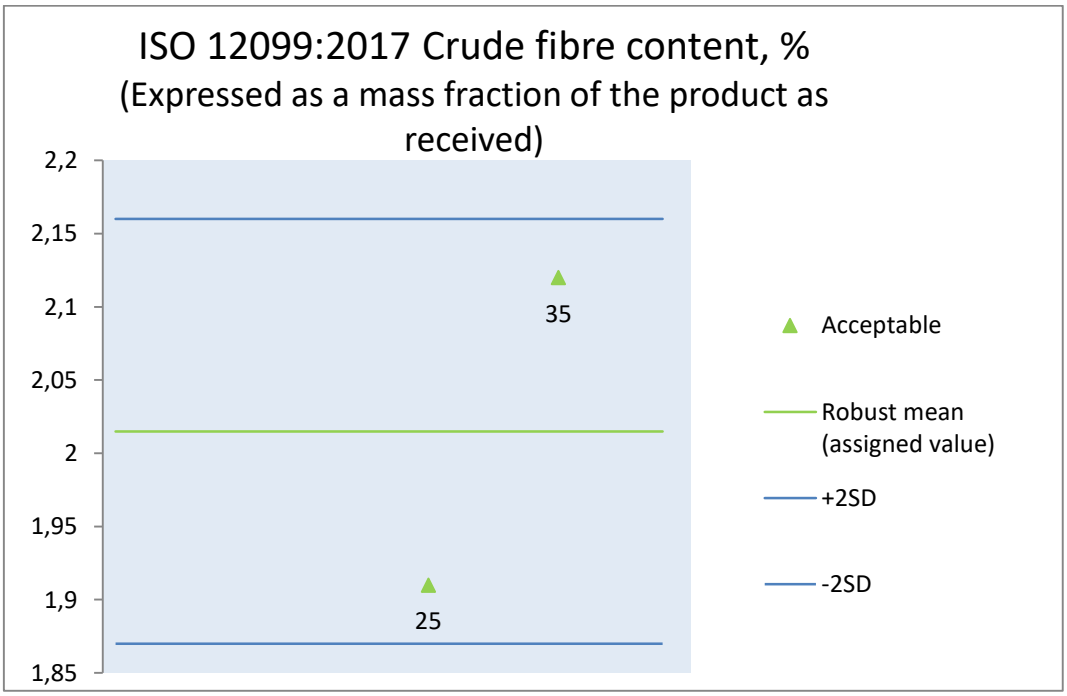
## 8.15. ISO 6865:2000/ ДСТУ ISO 6865:2004 Crude fibre content, % (Expressed as a mass fraction of the product as received)



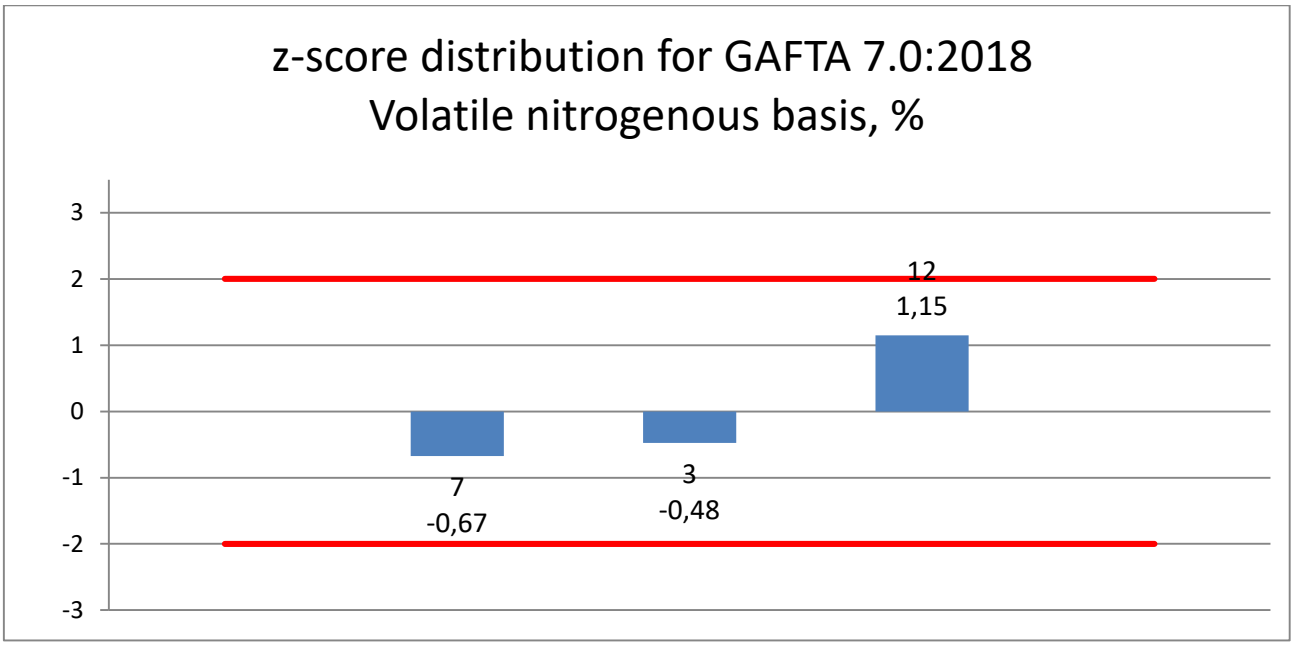



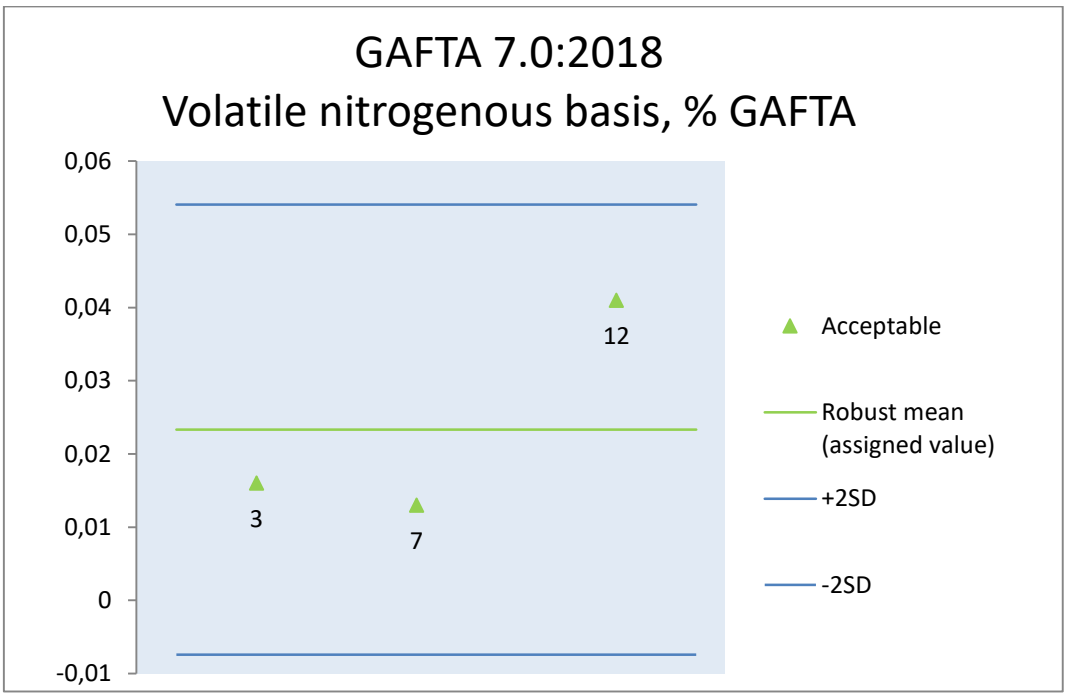
## 8.16. ISO 12099:2017 Crude fibre content, % (Expressed as a mass fraction of the product as received)



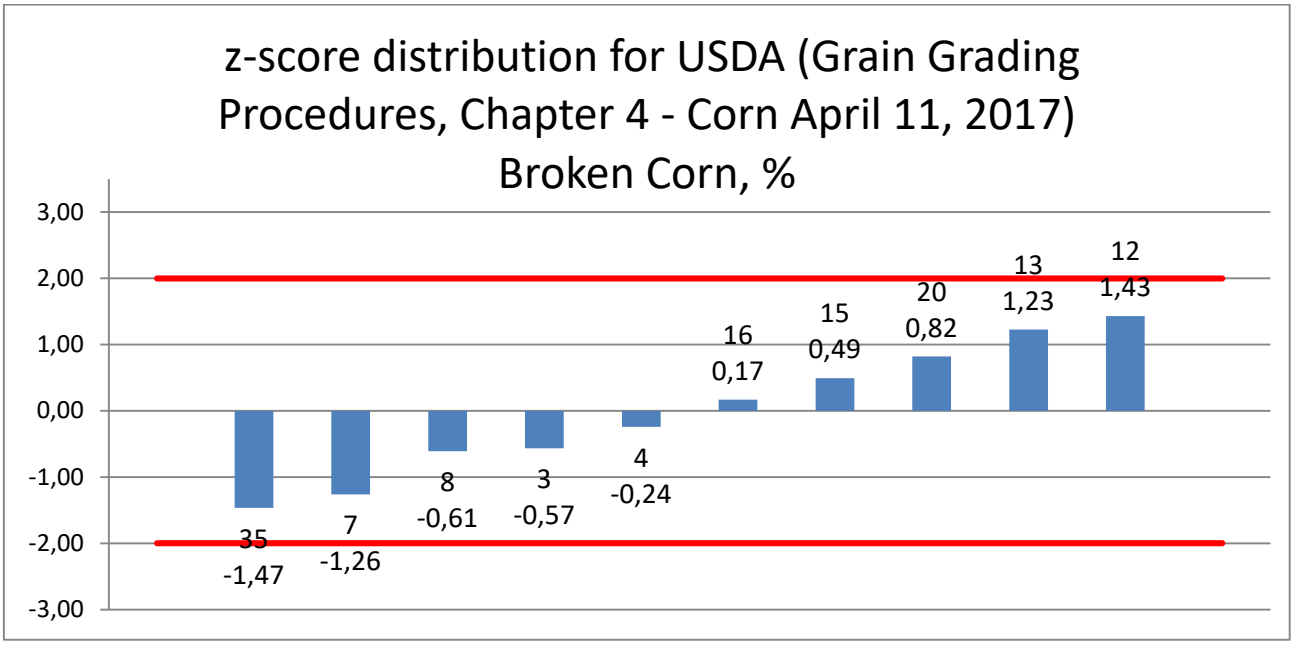



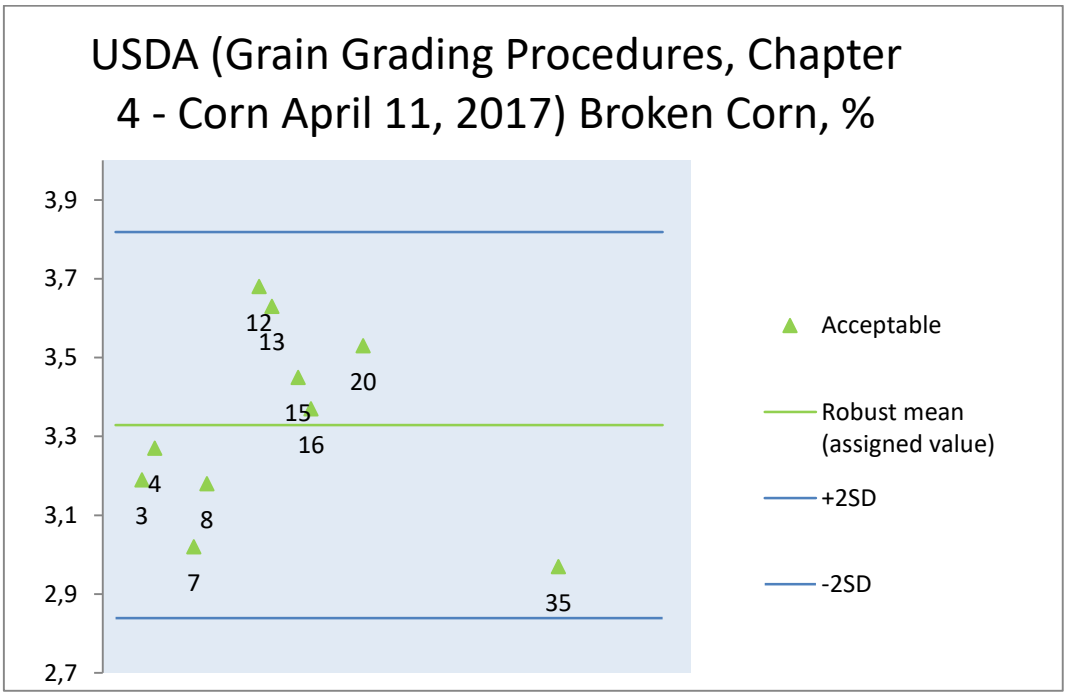
## 8.17. GAFTA 7.0:2018 Volatile nitrogenous basis, %



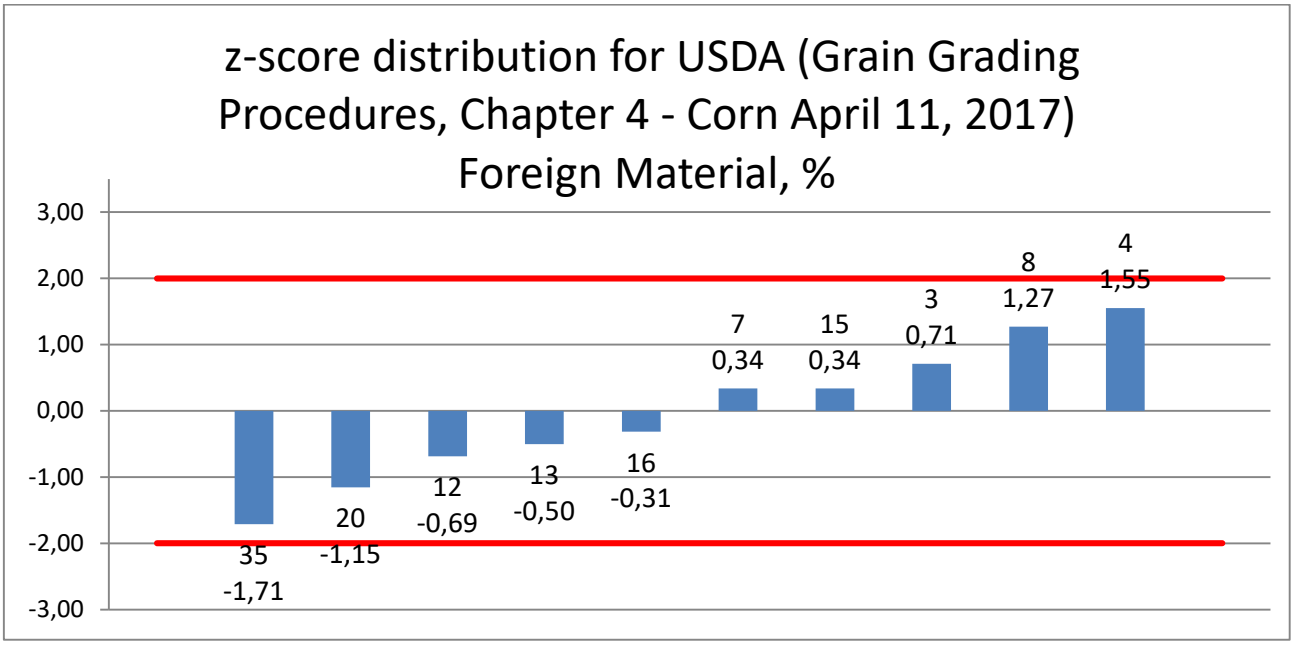



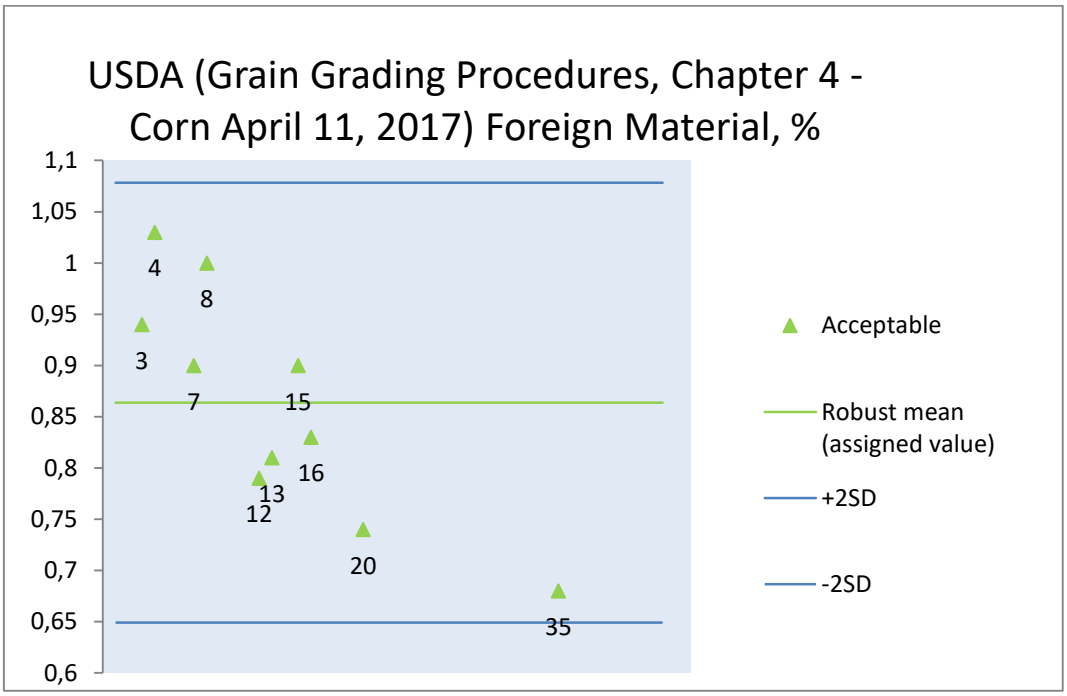
## 8.18. USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) Broken Corn, %



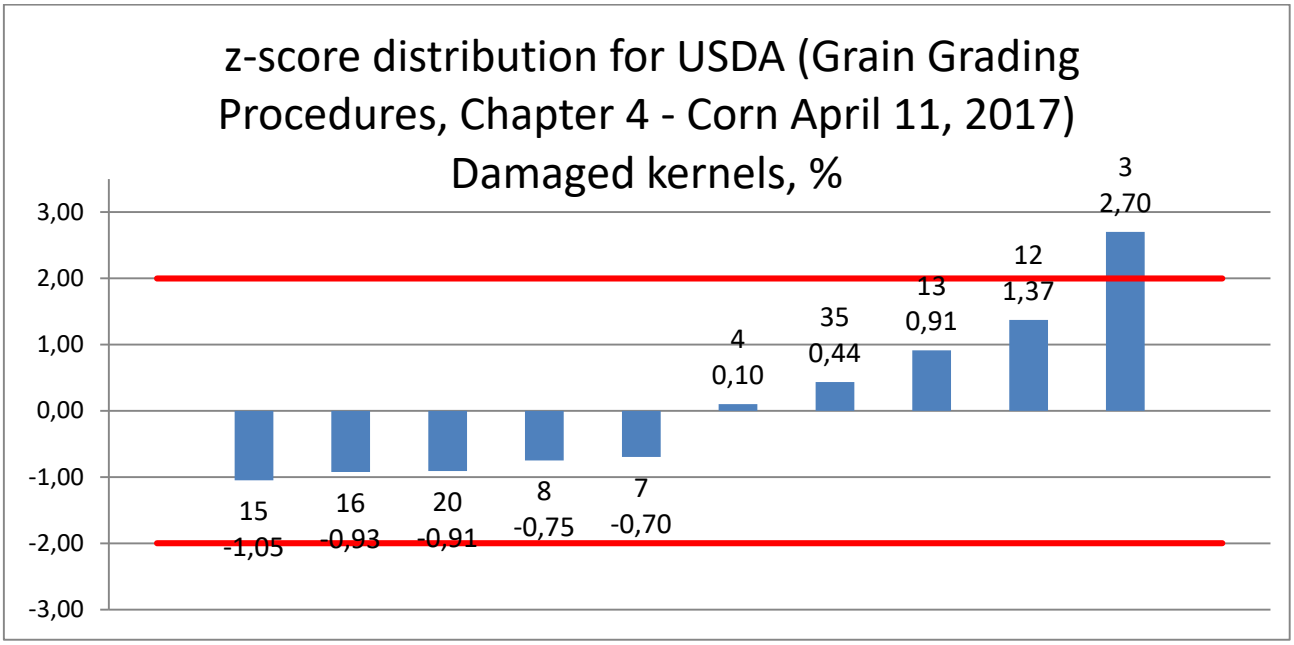



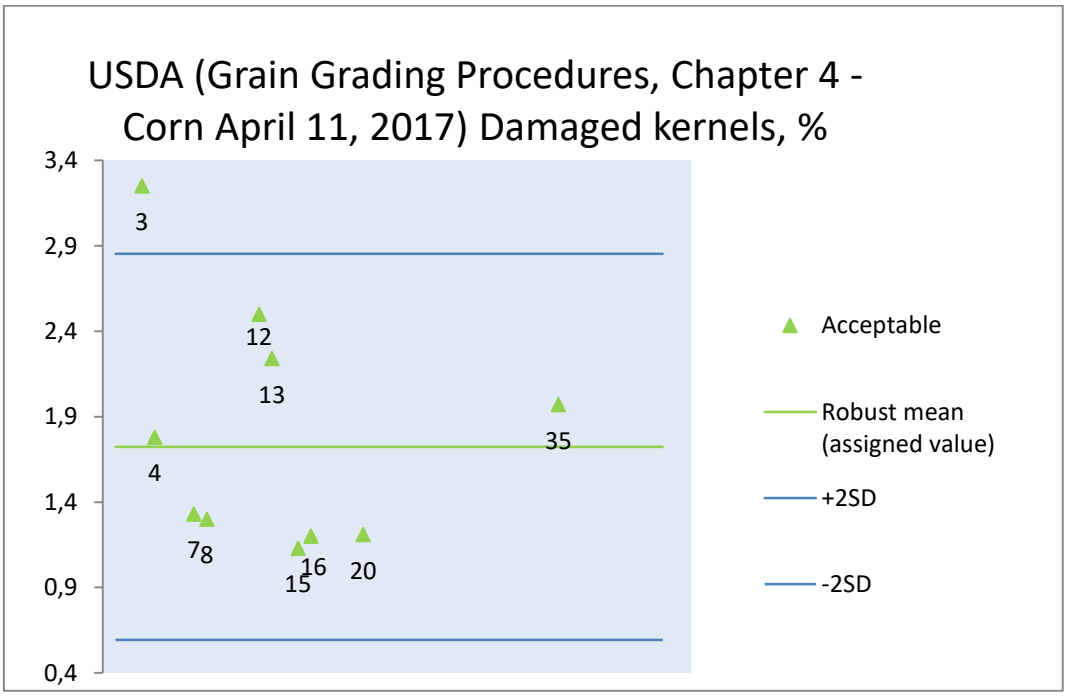
## 8.19. USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) Foreign Material, %



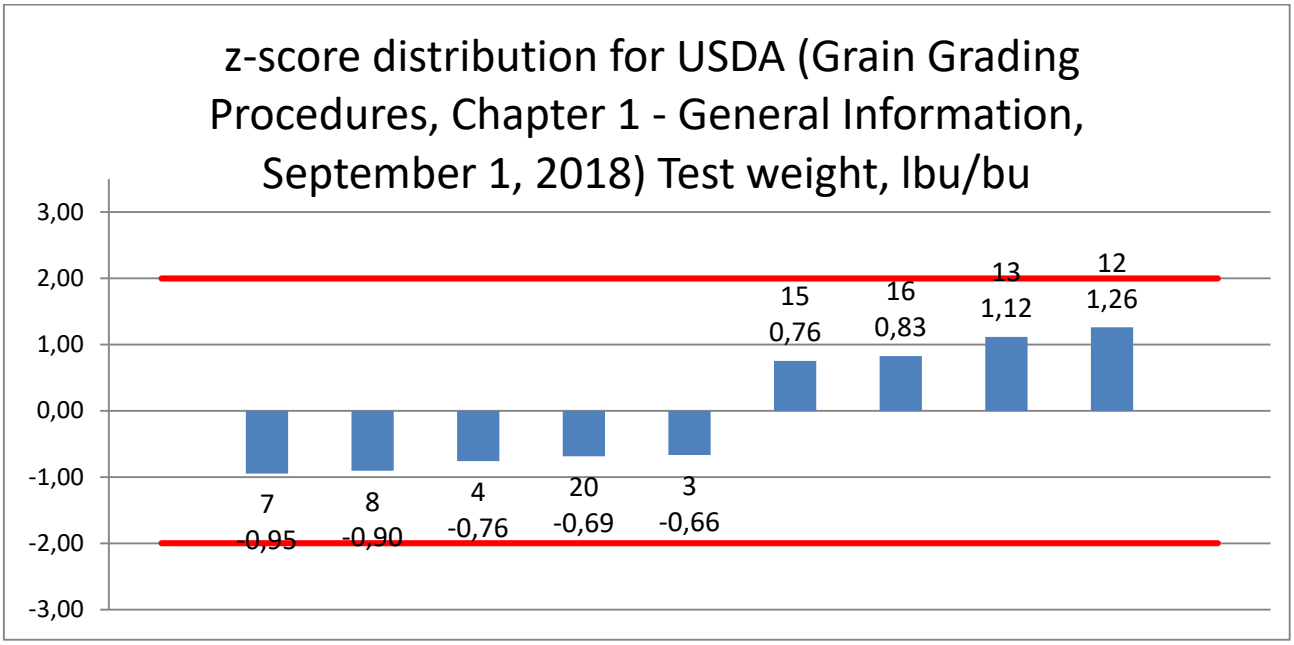



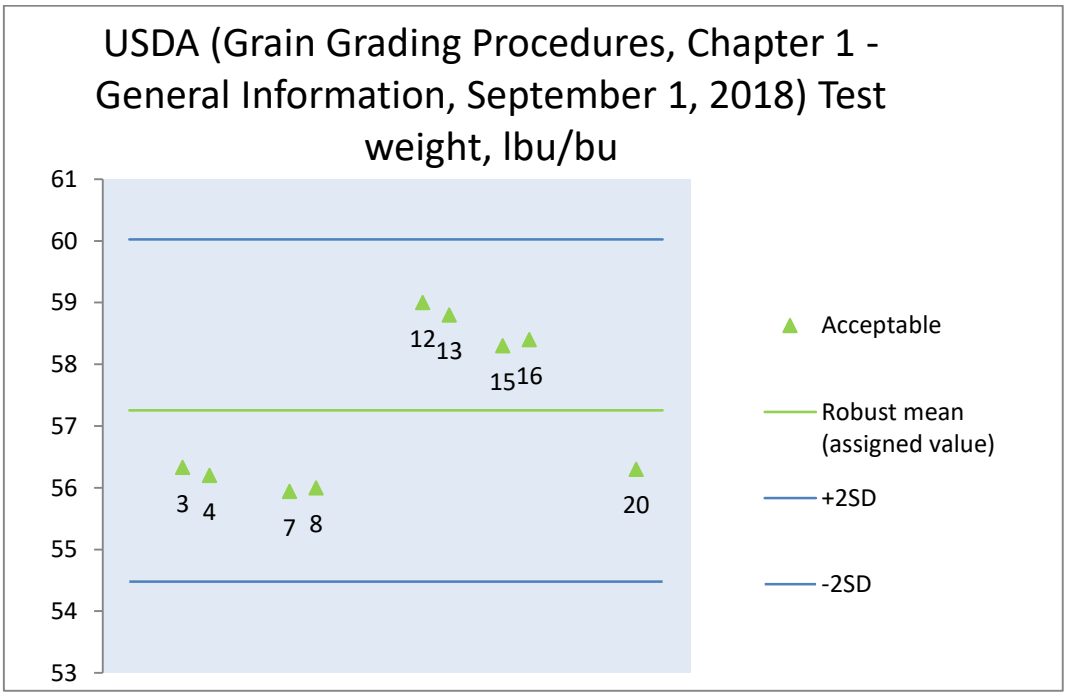
## 8.20. USDA (Grain Grading Procedures, Chapter 4 - Corn April 11, 2017) Damaged kernels, %



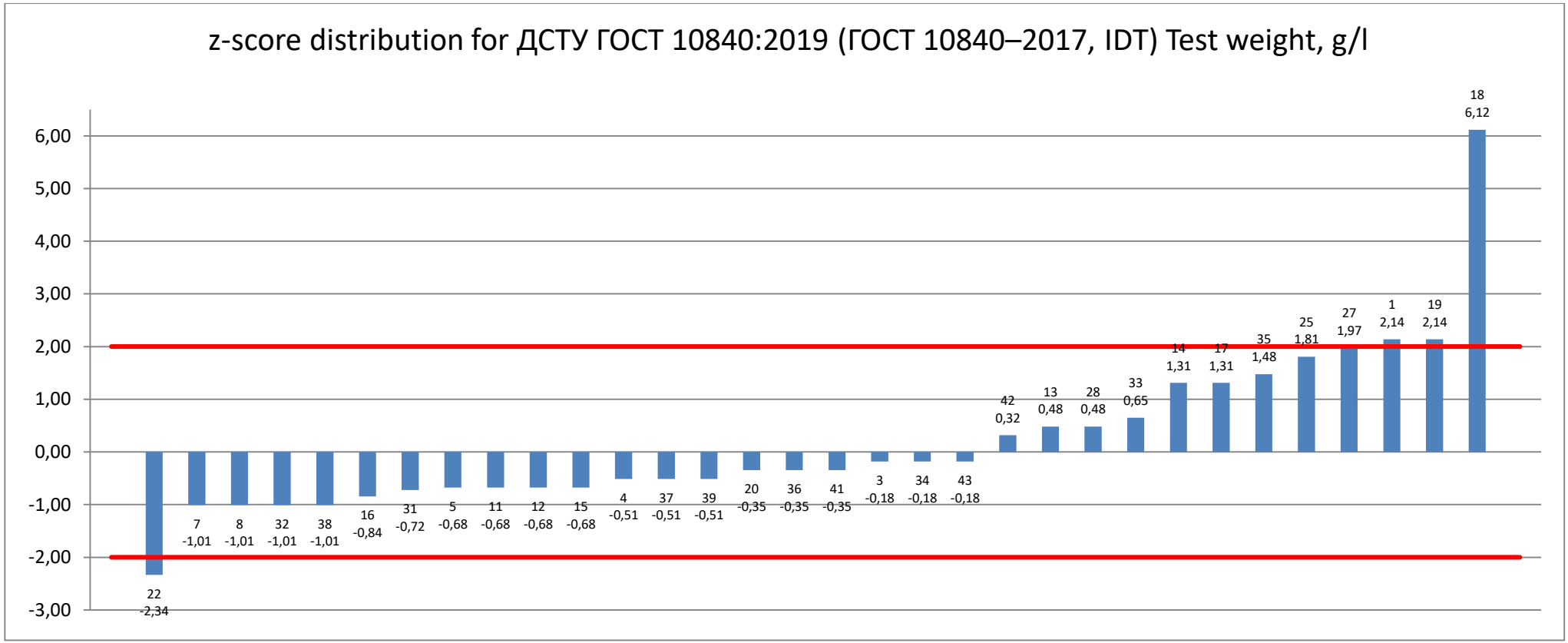



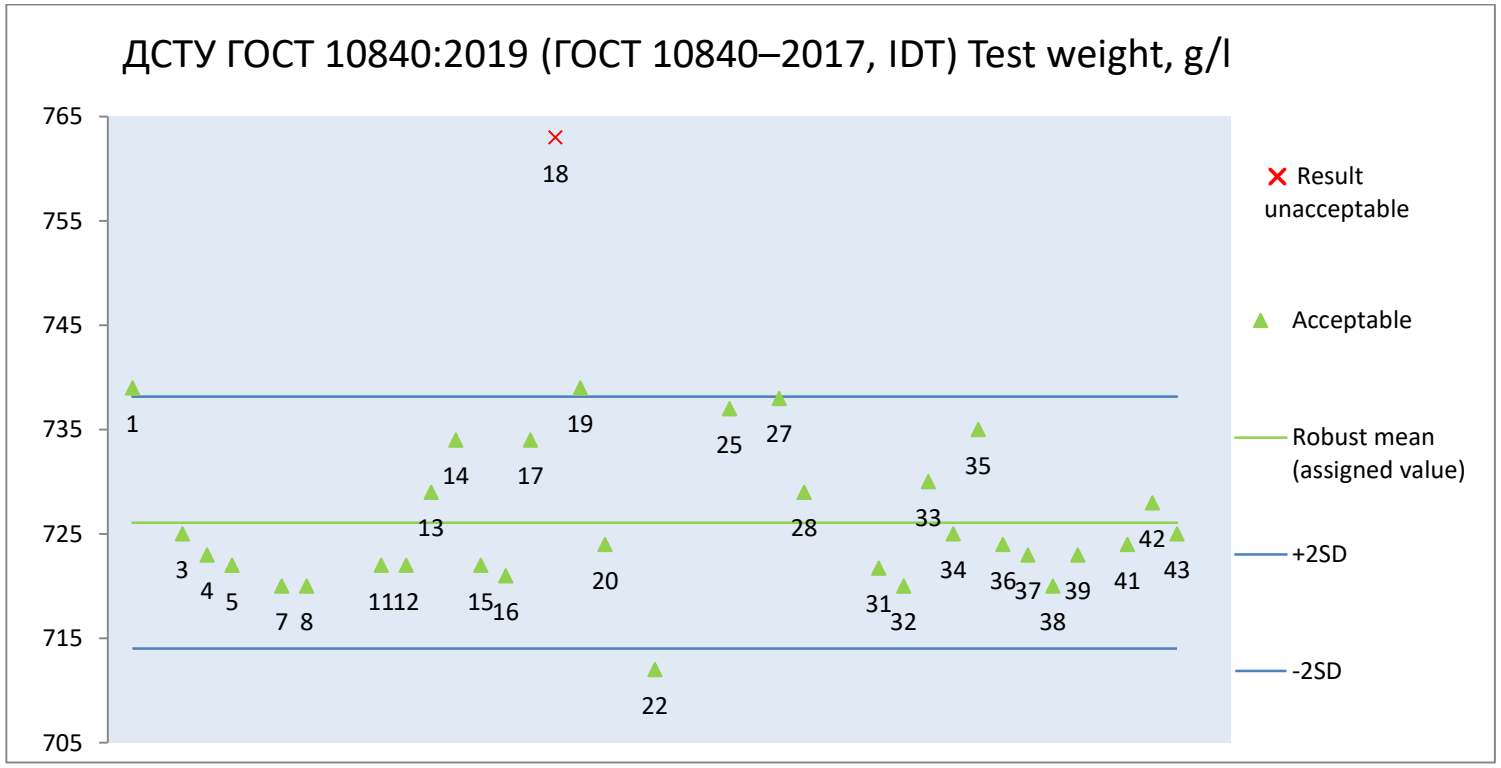
## 8.21. USDA (Grain Grading Procedures, Chapter 1 - General Information, September 1, 2018) Test weight, lbu/bu



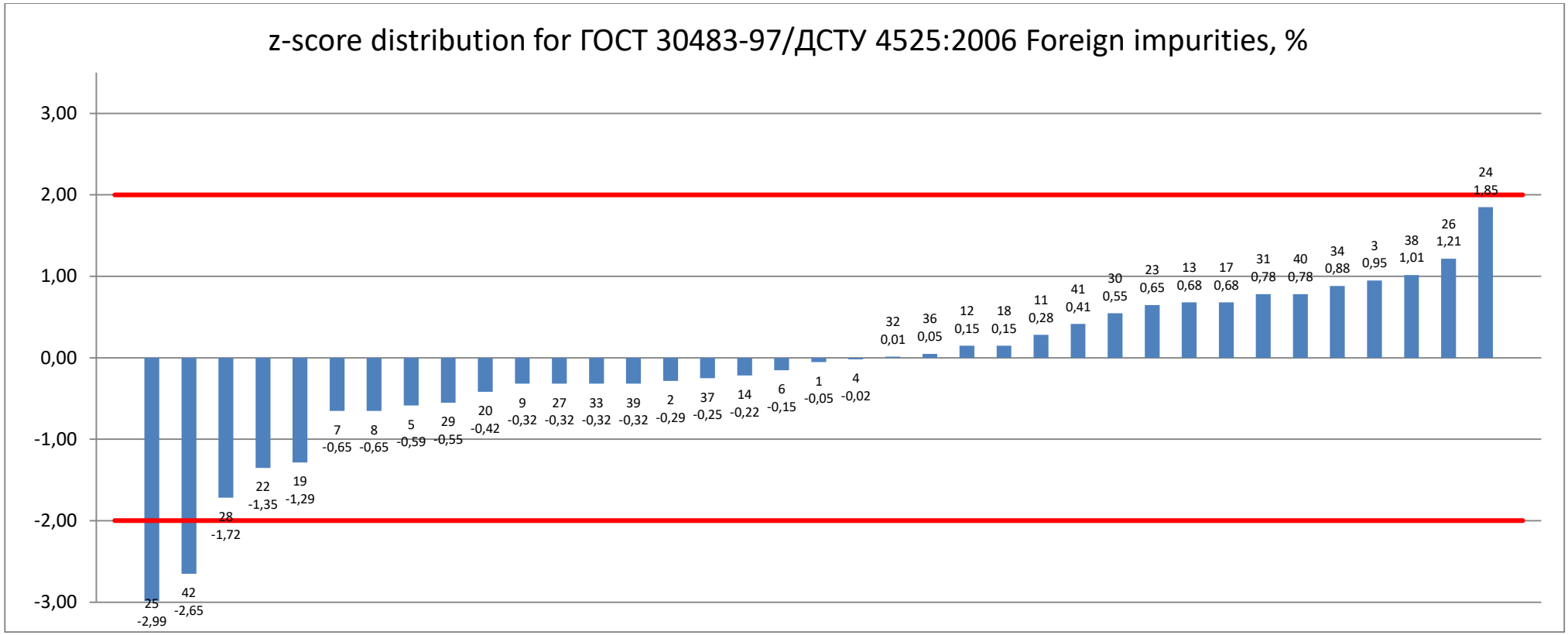



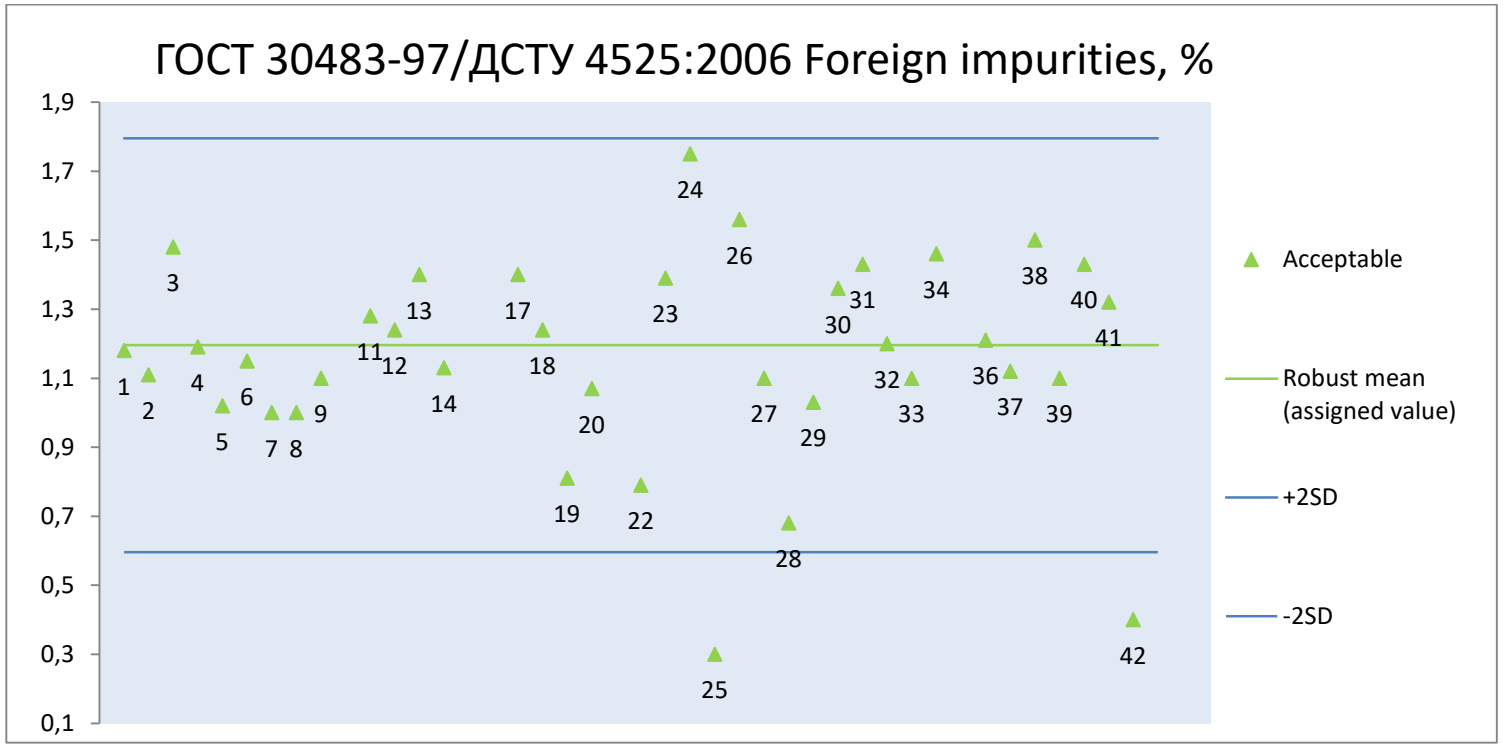
## 8.22. ДСТУ ГОСТ 10840:2019 (ГОСТ 10840–2017, IDT) Test weight, g/l



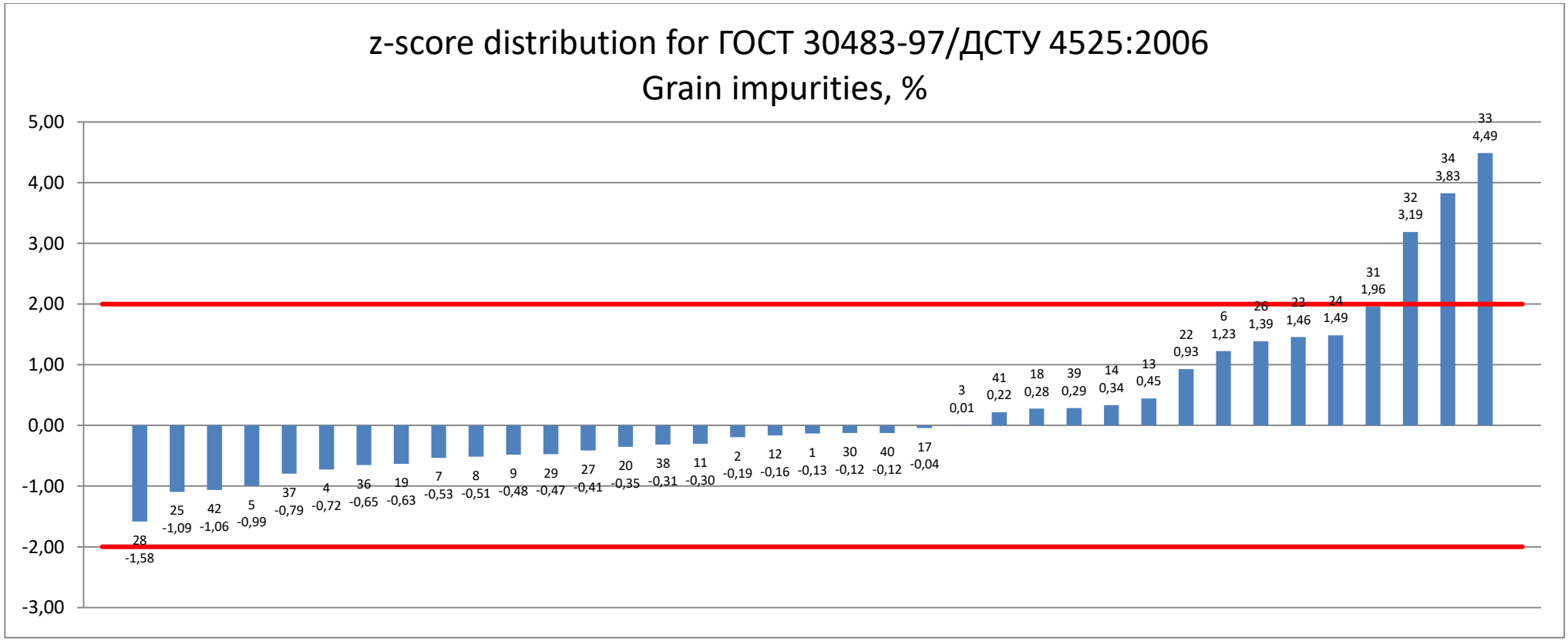

ДСТУ ГОСТ 10840:2019 (ГОСТ 10840–2017, IDT) Test weight, g/l
765
755
745
735
725
715
705
18
1
19
25
27
14
17
35
13
28
33
3
4
5
20
42
43
34
7
8
1112
15
16
31
32
36
37
39
41
38
22
Result unacceptable
Acceptable
Robust mean (assigned value)
+2SD
-2SD

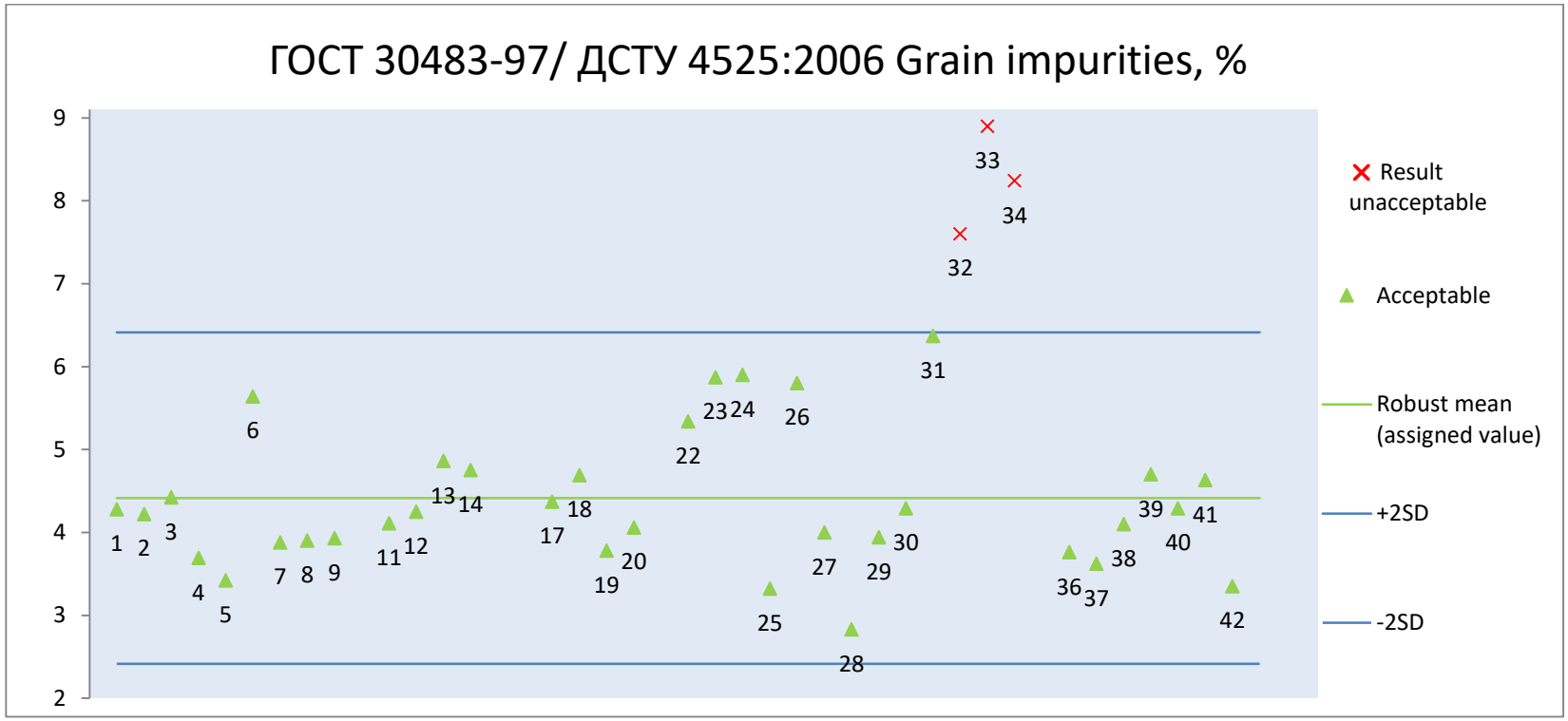
## 8.23. ГОСТ 30483-97/ ДСТУ 4525:2006 Foreign impurities, %



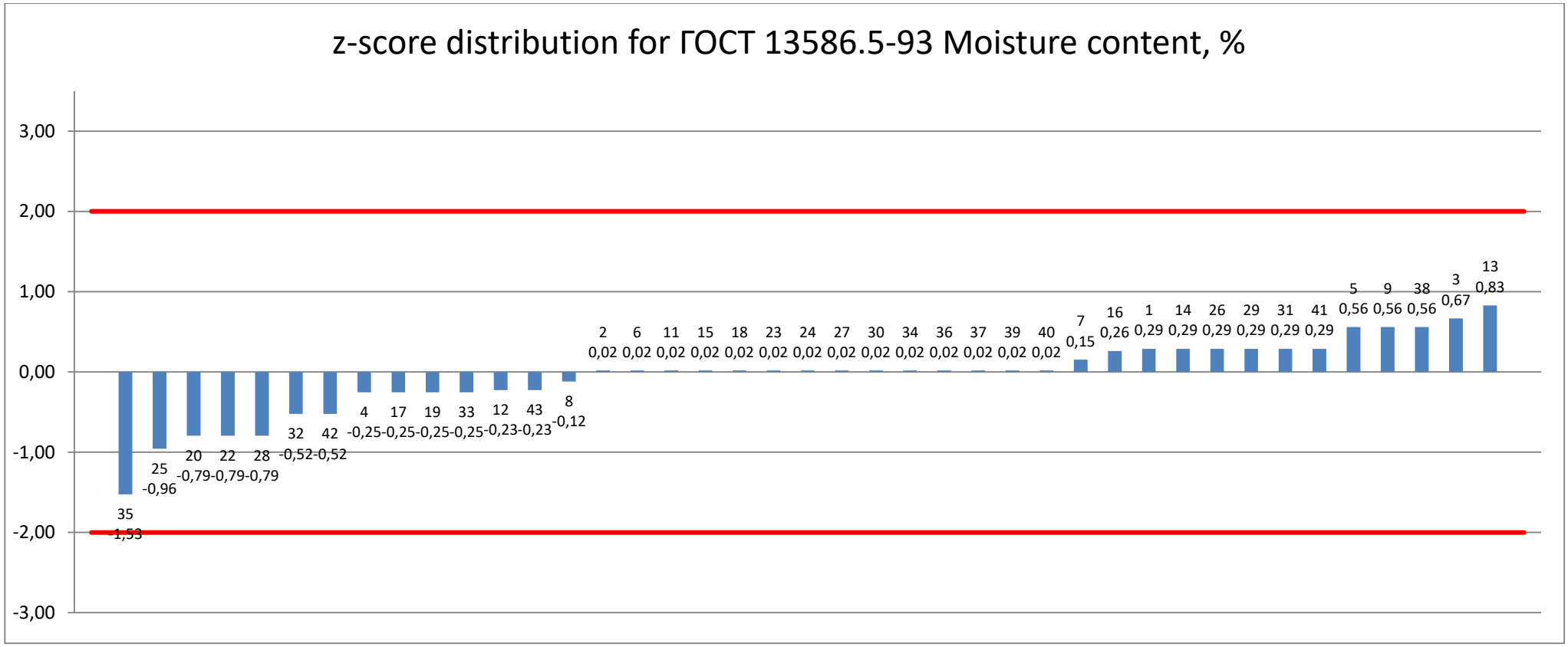

ГОСТ 30483-97/ДСТУ 4525:2006 Foreign impurities, %
1,9
1,7
1,5
1,3
1,1
0,9
0,7
0,5
0,3
0,1
1
2
3
4
5
6
7
8
9
11
12
13
14
17
18
19
20
22
23
24
25
26
27
28
29
30
31
32
33
34
36
37
38
39
40
41
42
Acceptable
Robust mean (assigned value)
+2SD
-2SD

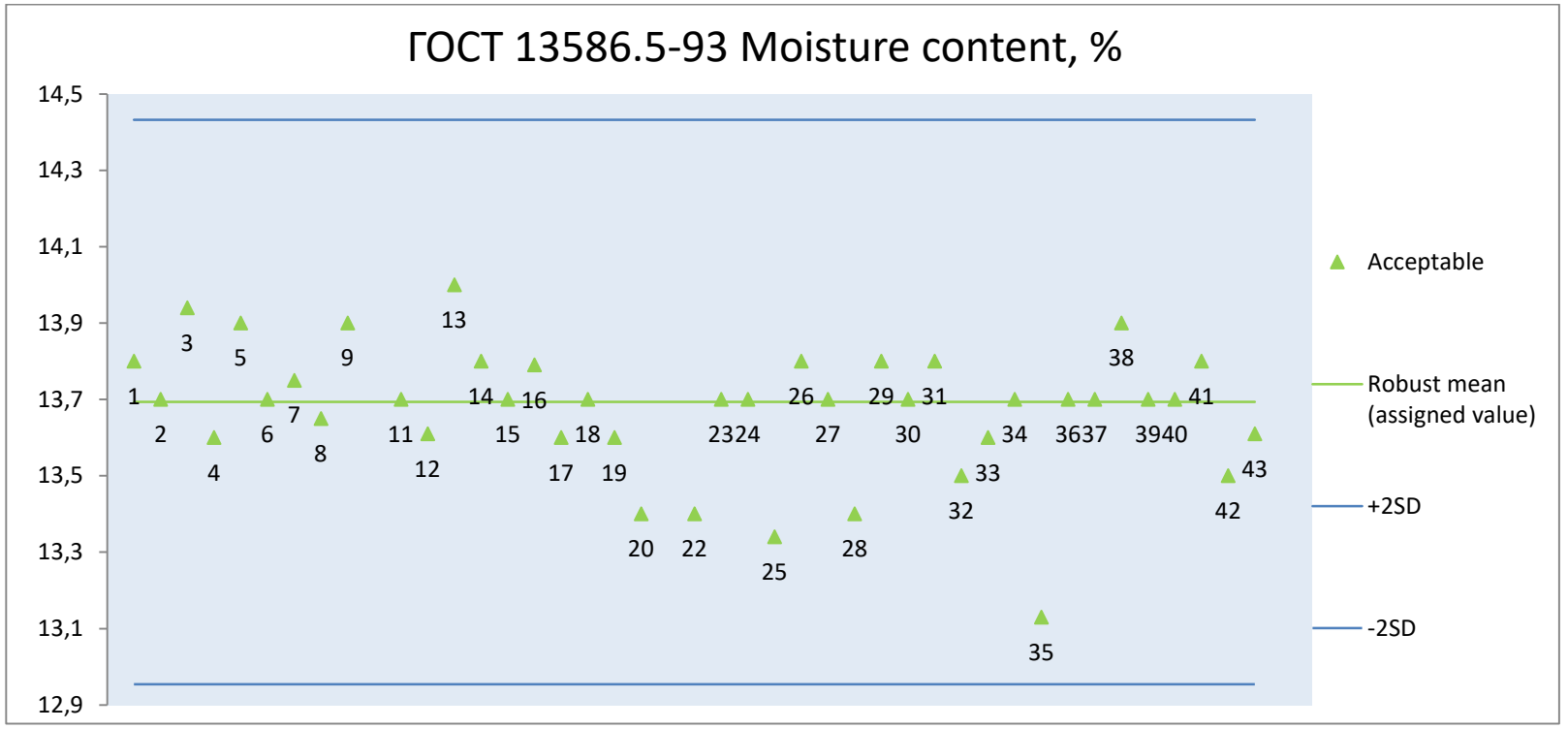
## 8.24. ГОСТ 30483-97/ ДСТУ 4525:2006 Grain impurities, %



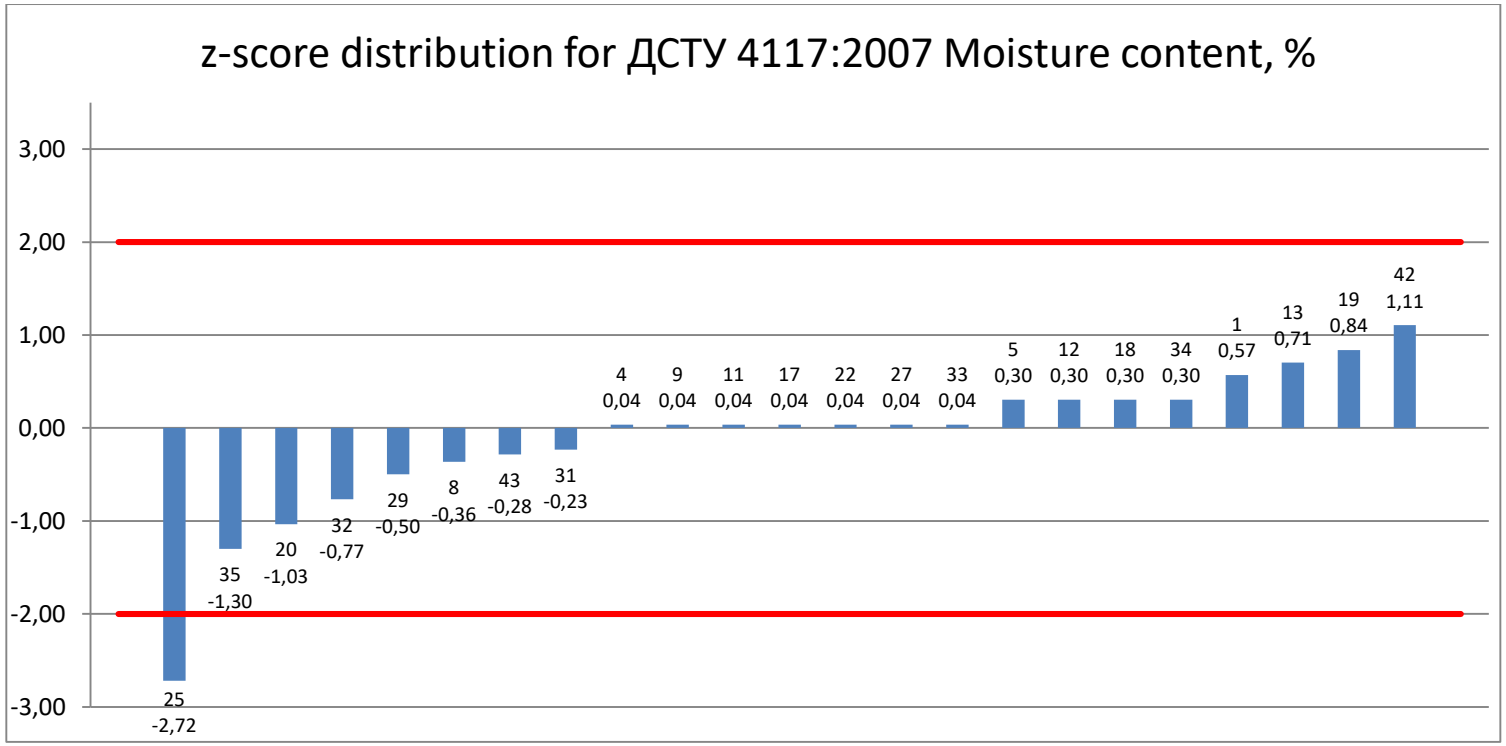

ГОСТ 30483-97/ ДСТУ 4525:2006 Grain impurities, %
9
8
7
6
5
4
3
2
1 2 3 4 5 6 7 8 9 11 12 13 14 17 18 19 20 22 23 24 25 26 27 28 29 30 31 32 33 34 36 37 38 39 40 41 42
Result unacceptable
Acceptable
Robust mean (assigned value)
+2SD
-2SD

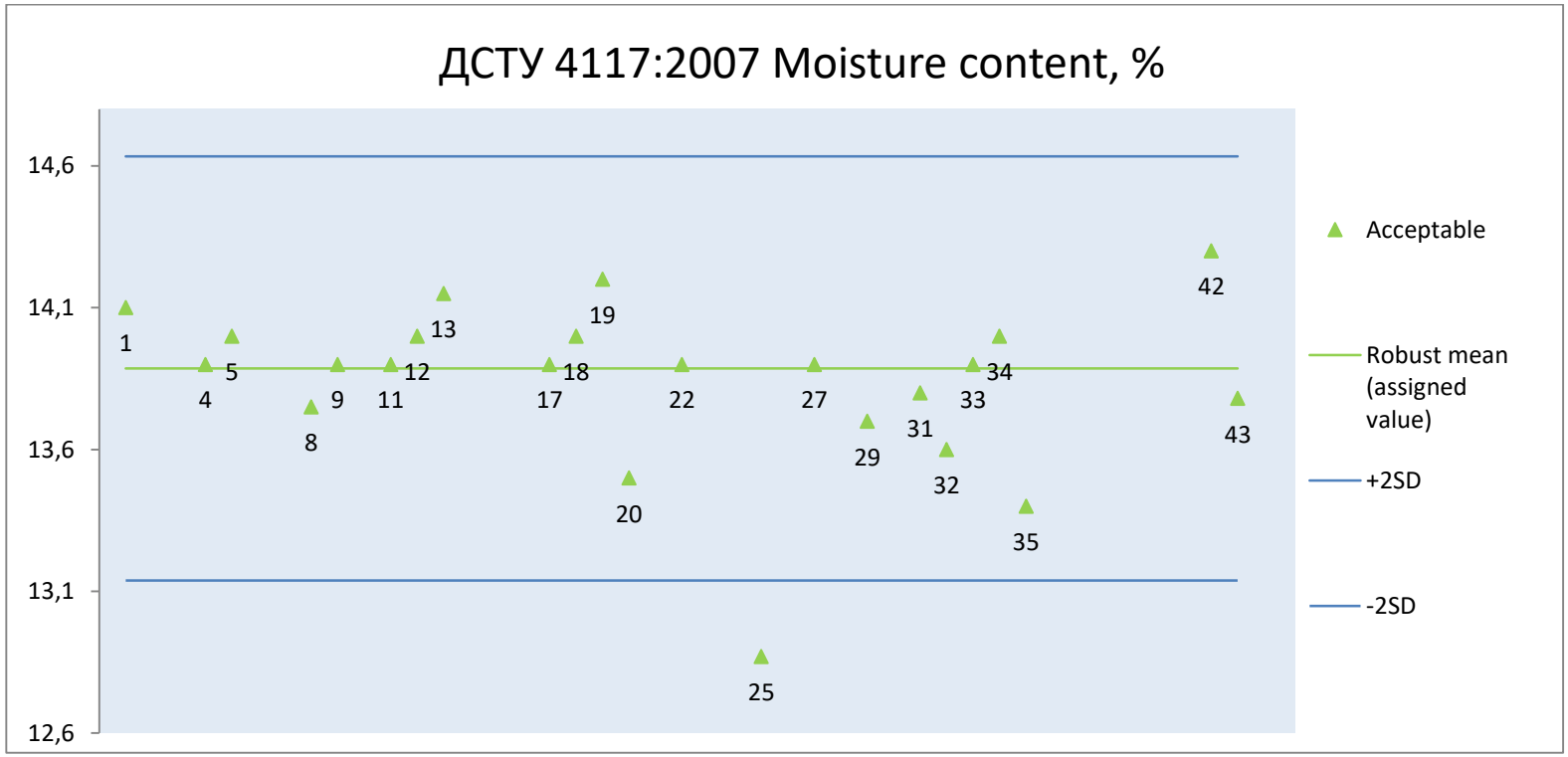
## 8.25. ГОСТ 13586.5-93 Moisture content, %



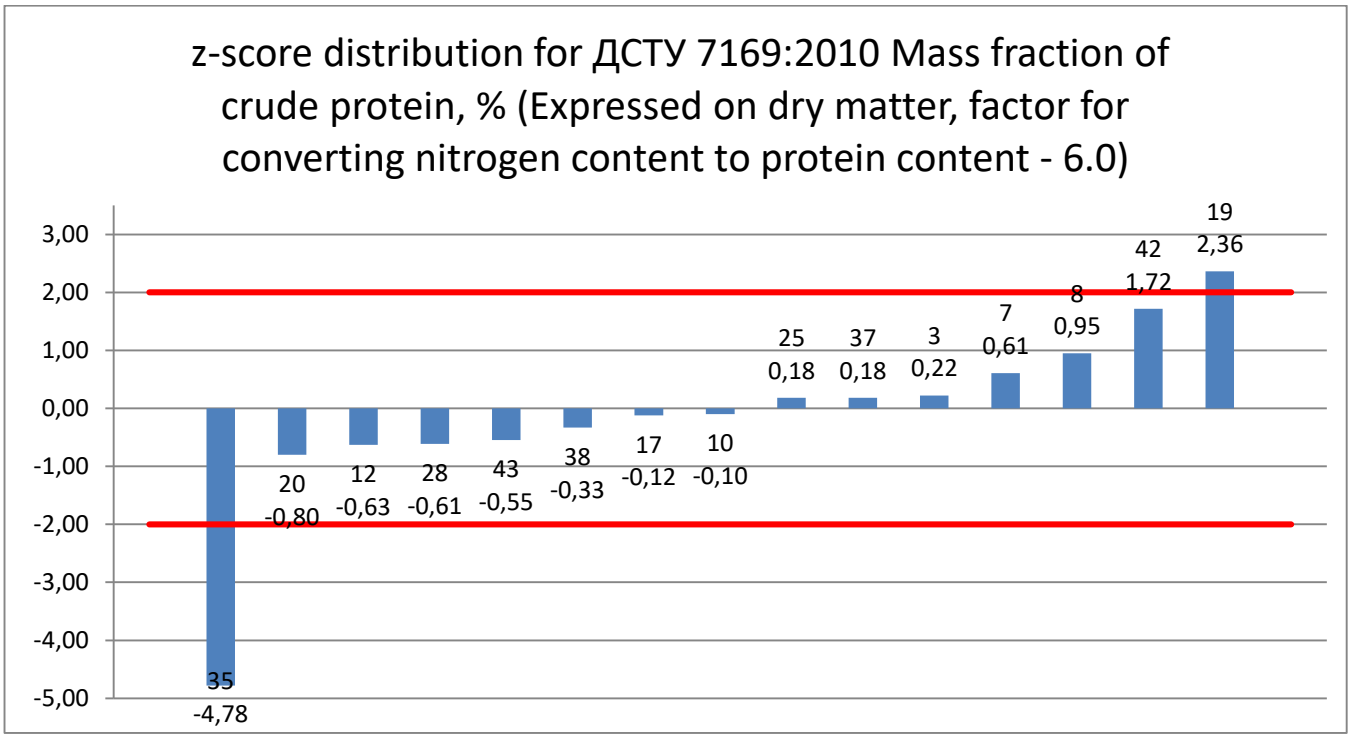

ГОСТ 13586.5-93 Moisture content, %
14,5
14,3
14,1
13,9
13,7
13,5
13,3
13,1
12,9
1 2 3 4 5 6 7 8 9 11 12 13 14 15 16 17 18 19 20 22 2324 25 26 27 28 29 30 31 32 33 34 3637 3940 35 38 41 42 43
Acceptable
Robust mean (assigned value)
+2SD
-2SD

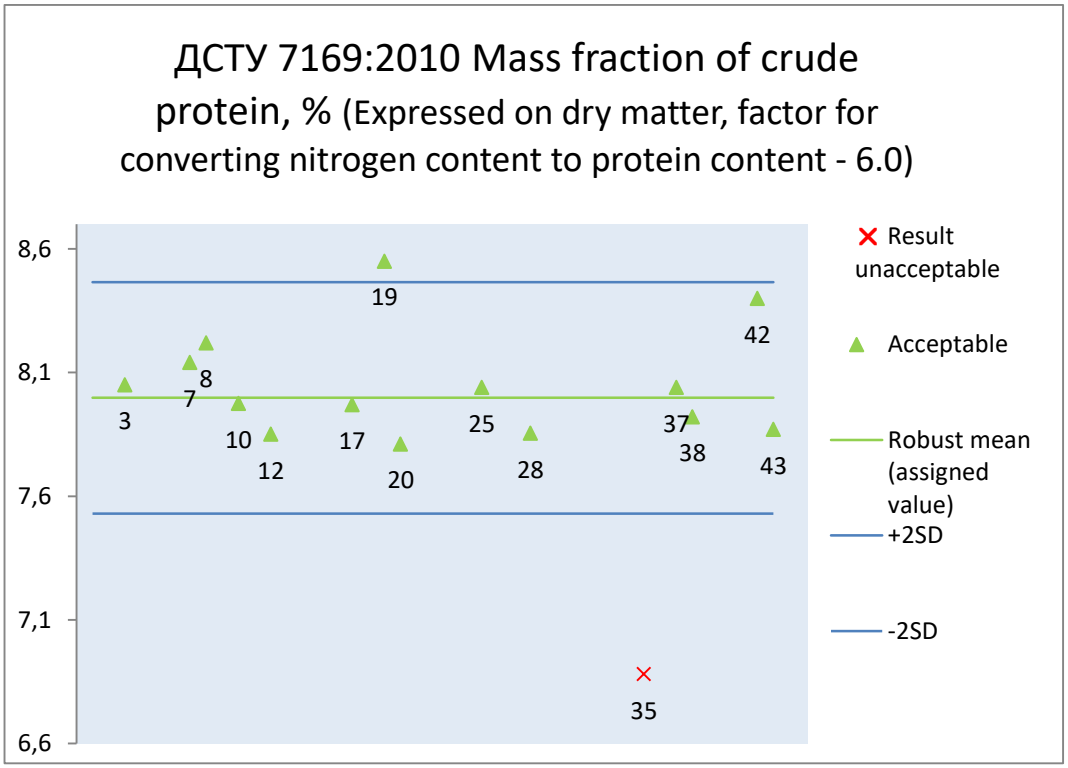
## 8.26. ДСТУ 4117:2007 Moisture content, %



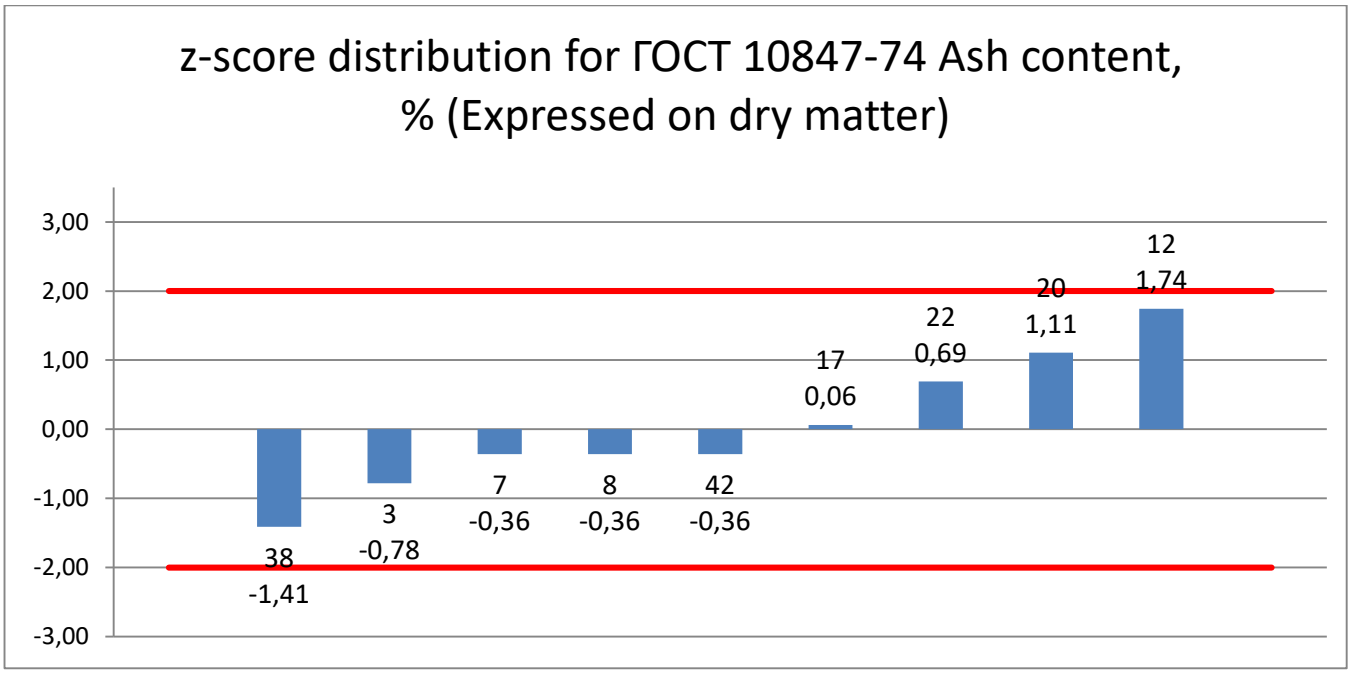

ДСТУ 4117:2007 Moisture content, %
14,6
14,1
13,6
13,1
12,6
1
4
5
8
9
11
12
13
17
18
19
20
22
25
27
29
31
32
33
34
35
42
43
Acceptable
Robust mean (assigned value)
+2SD
-2SD

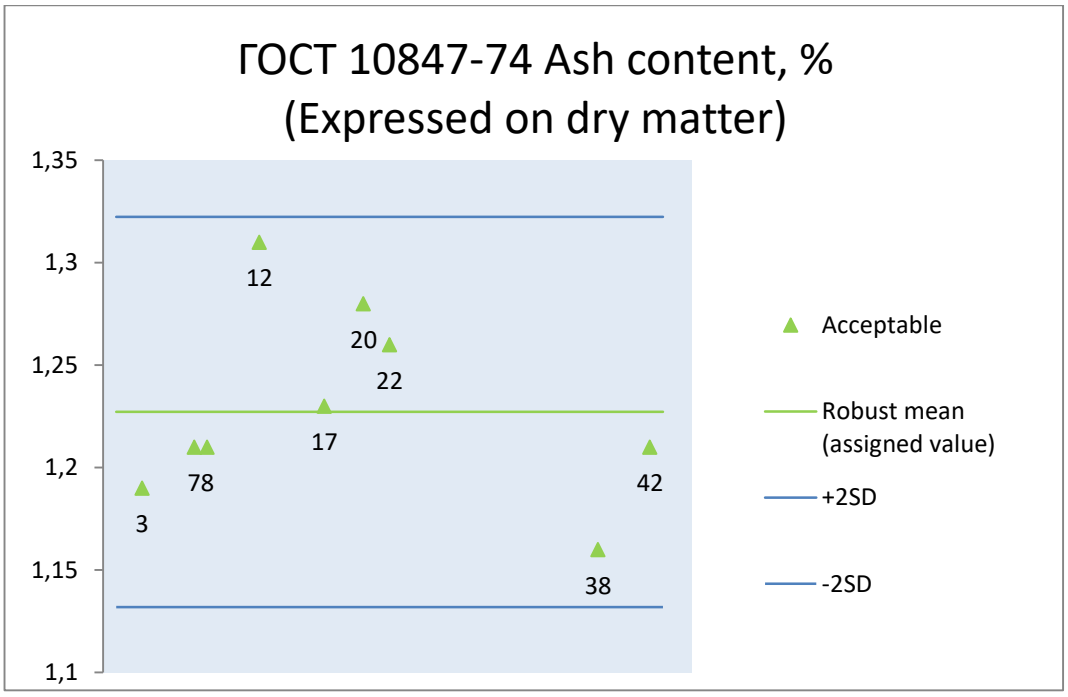
## 8.27. ДСТУ 7169:2010 Mass fraction of crude protein, % (Expressed on dry matter, factor for converting nitrogen content to protein content - 6.0)



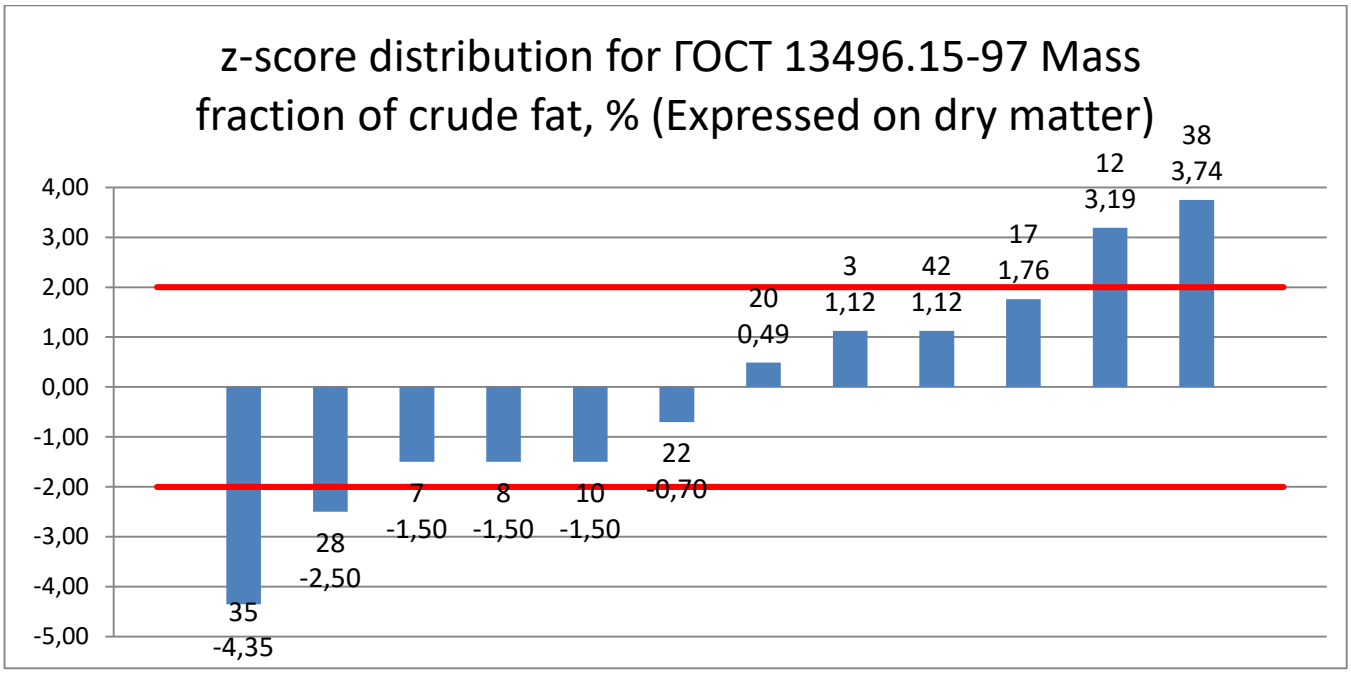



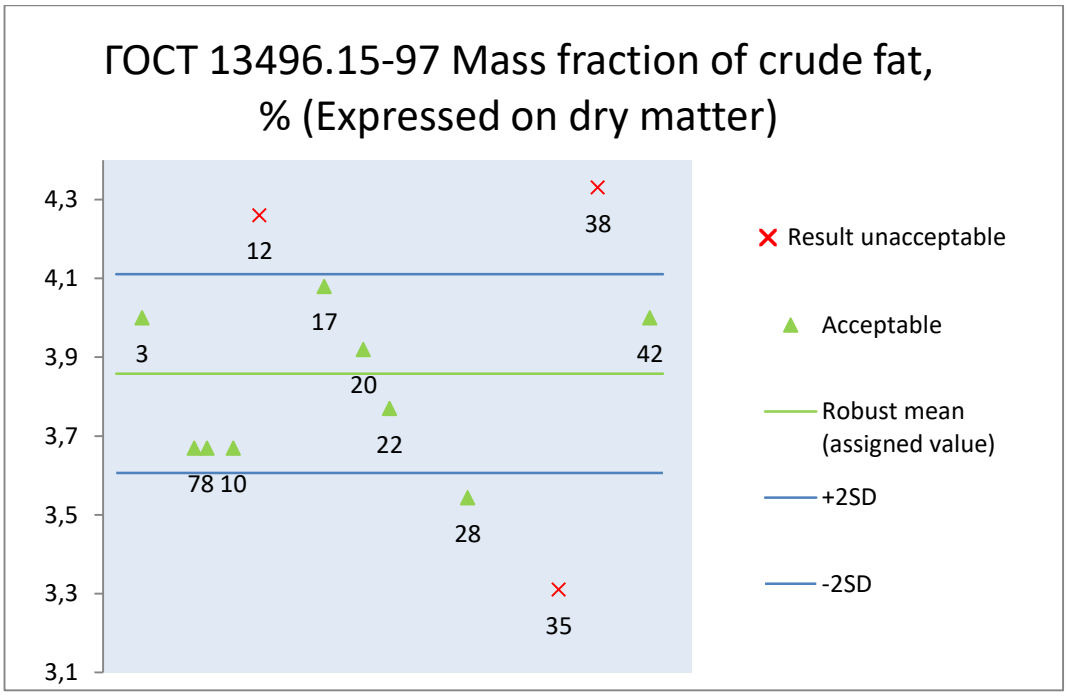
## 8.28. ГОСТ 10847-74 Ash content, % (Expressed on dry matter)



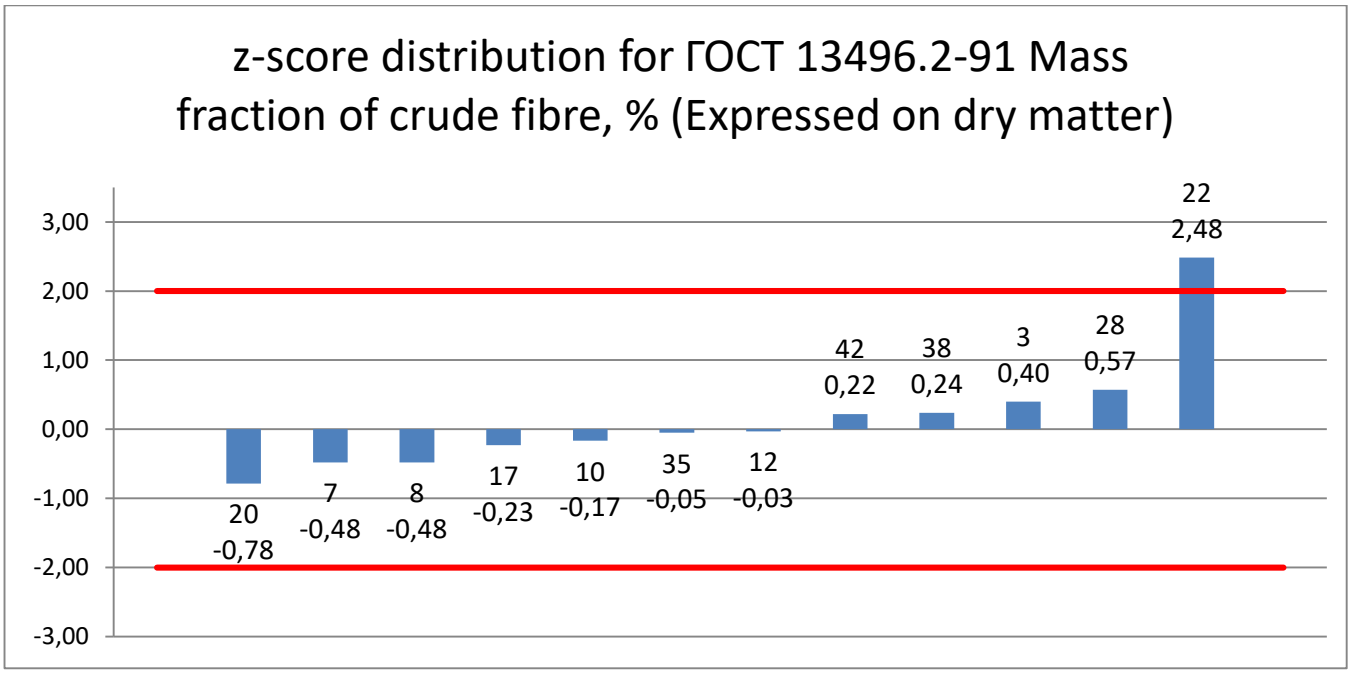



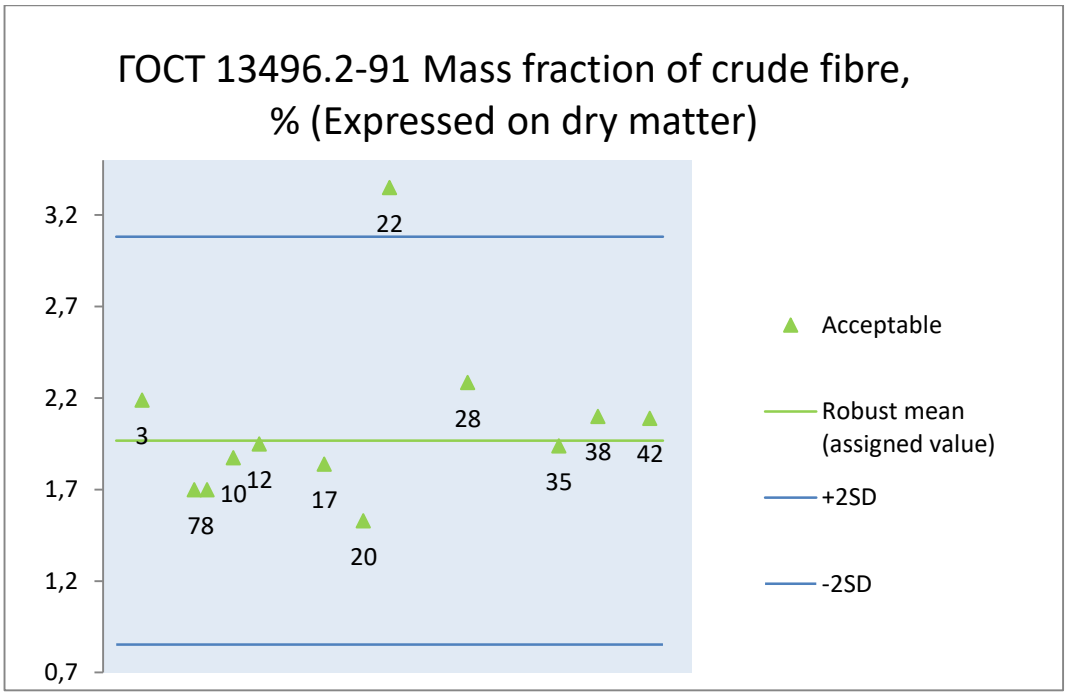
## 8.29. ГОСТ 13496.15-97 Mass fraction of crude fat, % (Expressed on dry matter)



## 8.30. ГОСТ 13496.2-91 Mass fraction of crude fibre, % (Expressed on dry matter)



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