

AOF Test Check program

Test Report

Round 1 2021-2022.

Summary

1. The test materials for the AOF test check program Round 1 2021-2022 were dispatched in July 2021. Each participant received two canola seed test sample to be analysed for a selection of parameters.
2. An assigned value was determined for each analyte and in conjunction with the standard deviation was used to calculate the z-score for each result.
3. Results for this proficiency test are summarised as follows:

Table 1 Sample 1 - Assigned values and standard deviation

Analyte	Assigned value	Standard deviation	units	No. of participating laboratories
Test weight	66.87	0.37	(kg/hL)	12
Impurities	1.02	0.22	%	12
Oil NIR	45.07	0.44	% by weight	12
Oil solvent	45.02	0.99	% by weight	7
Moisture NIR	5.64	0.23	% by weight	12
Moisture oven	5.55	0.42	% by weight	10
Oleic acid	61.50	1.29	% total fatty acids	7
Linoleic acid	19.85	0.28	% total fatty acids	7
Linolenic acid	9.86	0.52	% total fatty acids	7
Free fatty acid	0.29	0.15	% (as oleic acid)	7

Table 2 Sample 2 - Assigned values and standard deviation

Analyte	Assigned value	Standard deviation	units	No. of participating laboratories
Test weight	67.59	0.59	(kg/hL)	12
Impurities	1.18	0.16	%	12
Oil NIR	45.67	0.71	% by weight	12
Oil solvent	46.04	1.61	% by weight	7
Moisture NIR	6.65	0.09	% by weight	11
Moisture oven	6.51	0.43	% by weight	10
Oleic acid	59.85	1.55	% total fatty acids	7
Linoleic acid	21.59	1.04	% total fatty acids	7
Linolenic acid	10.11	0.48	% total fatty acids	7
Free fatty acid	0.40	0.20	% (as oleic acid)	7

1. Test Material

Preparations for this test check program were sub-contracted to organisations for sample packing and distribution as well as data analysis and reporting.

2. Statistical evaluation of results

The results submitted by participants were statistically analysed in order to provide an assigned value for each analyte. The assigned values were then used in combination with the standard deviation to calculate a Z-score for each result.

Raw data was analysed using Grubbs' test to determine any outliers. Outliers (Z-score >2) were removed and the remaining samples were used to calculate the assigned value (mean) and standard deviation results.

Participants Z-scores were calculated as:

$$Z = \frac{(\textit{participants result} - \textit{assigned value})}{\textit{standard deviation}}$$

3. Results and Z-scores

Table 3 Results and Z-scores for test weight.

Test weight (kg/hL)				
Lab number	Sample 1		Sample 2	
	Result	Z-score	Result	Z-score
P01				
P02				
P03	66.70	-0.45	68.30	1.20
P04	66.95	0.23	67.01	-1.00
P05				
P06	68.00	3.10	68.00	0.69
P07	66.74	-0.34	67.70	0.18
P08	66.70	-0.45	67.10	-0.83
P09	68.44	4.30	67.50	-0.15
P10	67.48	1.66	68.46	1.47
P11	67.00	0.37	67.00	-1.00
P12	66.65	-0.59	67.85	0.44
P13				
P14				
P15				
P16	67.45	1.59	68.30	1.20
P17	66.30	-1.56	67.09	-0.85
P18	66.70	-0.45	66.80	-1.34
Assigned value	66.87		67.59	
Standard Deviation	0.37		0.59	
Count	12		12	

Note - Laboratory numbers P06 and P09 Sample 1 were removed from the assigned value calculation as the results were outliers.

Figure 1 Z-scores for test weight.

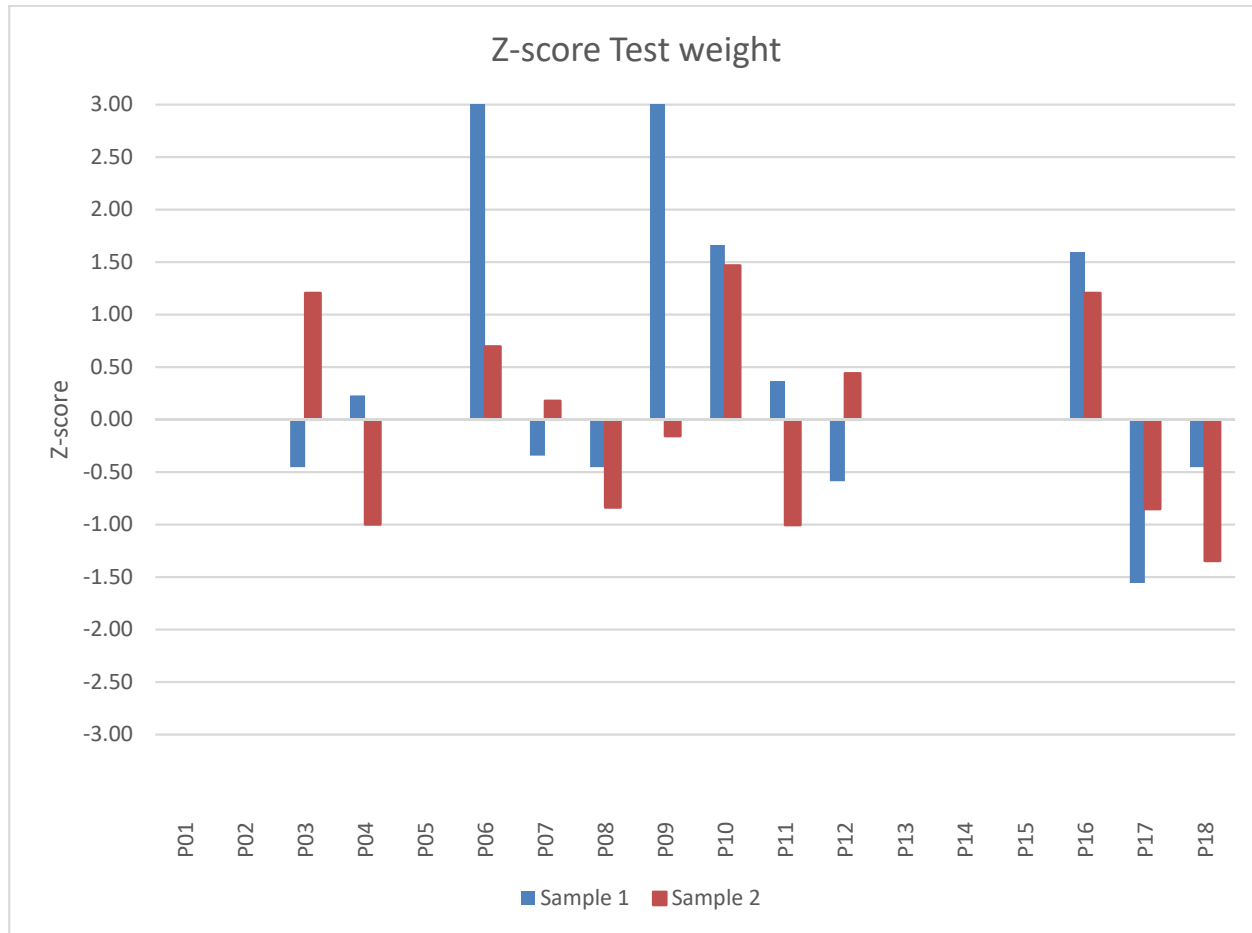


Table 4 Results and Z-scores for impurities.

Impurities (%)				
Lab number	Sample 1		Sample 2	
	Result	Z-score	Result	Z-score
P01				
P02				
P03	1.32	1.37	1.07	-0.66
P04	0.95	-0.30	1.17	-0.07
P05				
P06	1.14	0.54	1.05	-0.84
P07	1.06	0.18	1.35	1.09
P08	0.95	-0.30	1.15	-0.17
P09	1.10	0.38	1.20	0.16
P10	0.66	-1.64	1.04	-0.91
P11	0.82	-0.89	0.95	-1.49
P12	1.39	1.70	1.47	1.90
P13				
P14				
P15				
P16	1.08	0.27	1.18	0.00
P17	1.04	0.11	1.33	0.99
P18	0.70	-1.43	0.60	-3.71
Assigned value	1.02		1.18	
Standard Deviation	0.22		0.16	
Count	12		12	

Note - Laboratory number P18 Sample 2 was removed from assigned value calculation as the result was an outlier

Figure 2 Z-scores for impurities.

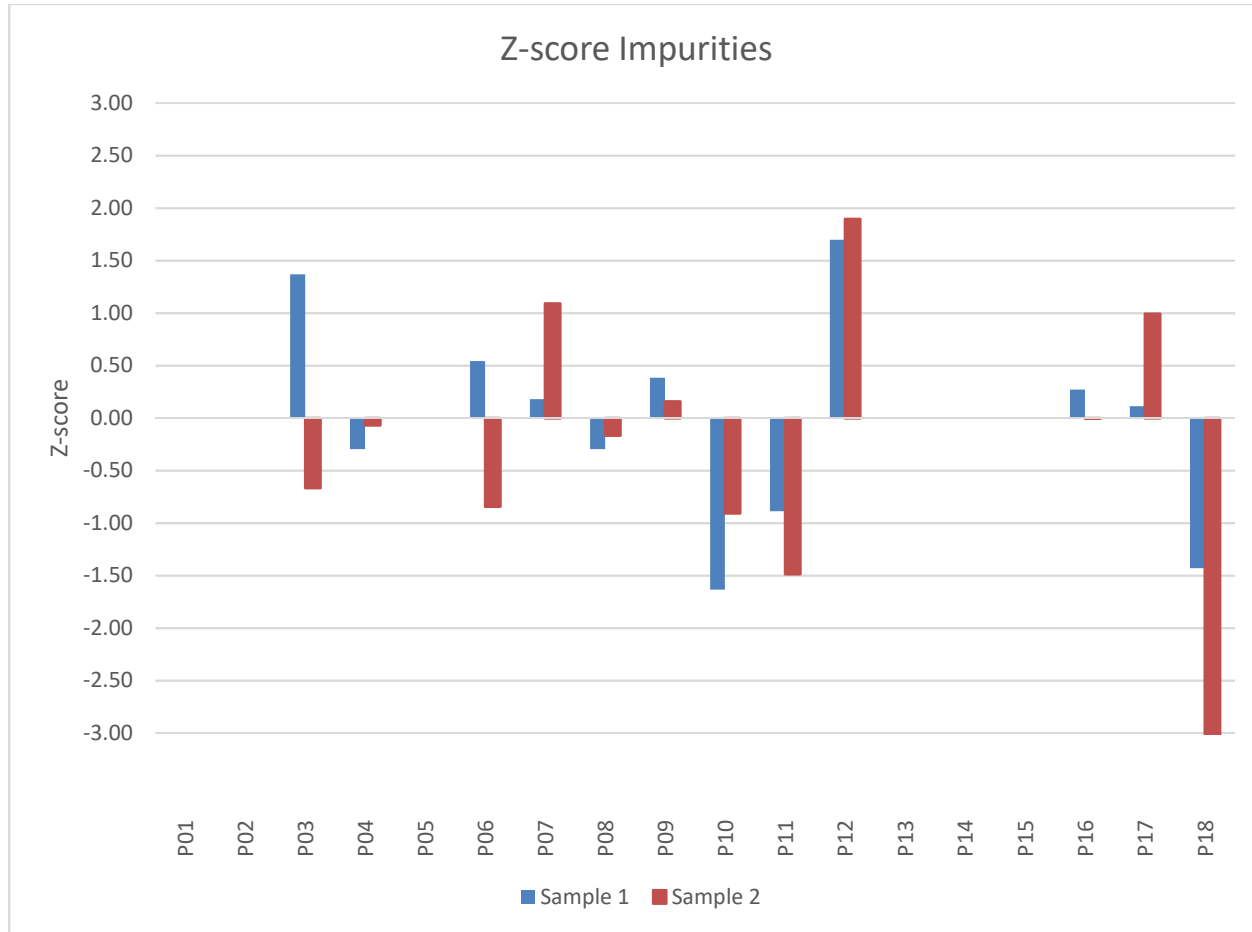


Table 5 Results and Z-scores for oil content (NIR).

Oil content NIR (%)				
Lab number	Sample 1		Sample 2	
	Result	Z-score	Result	Z-score
P01				
P02				
P03	44.85	-0.50	44.90	-1.08
P04	45.68	1.36	46.12	0.62
P05				
P06	45.46	0.86	47.04	1.92
P07	44.45	-1.41	45.17	-0.70
P08	44.70	-0.84	45.35	-0.45
P09	45.45	0.85	46.35	0.95
P10	45.35	0.63	46.10	0.60
P11	44.22	-1.93	44.57	-1.55
P12	45.37	0.67	46.22	0.76
P13				
P14				
P15				
P16	45.20	0.29	45.20	-0.66
P17	45.15	0.18	45.80	0.18
P18	45.00	-0.16	45.25	-1.34
Assigned value	45.07		45.67	
Standard Deviation	0.44		0.71	
Count	12		12	

Figure 3 Z-scores for oil content by NIR.

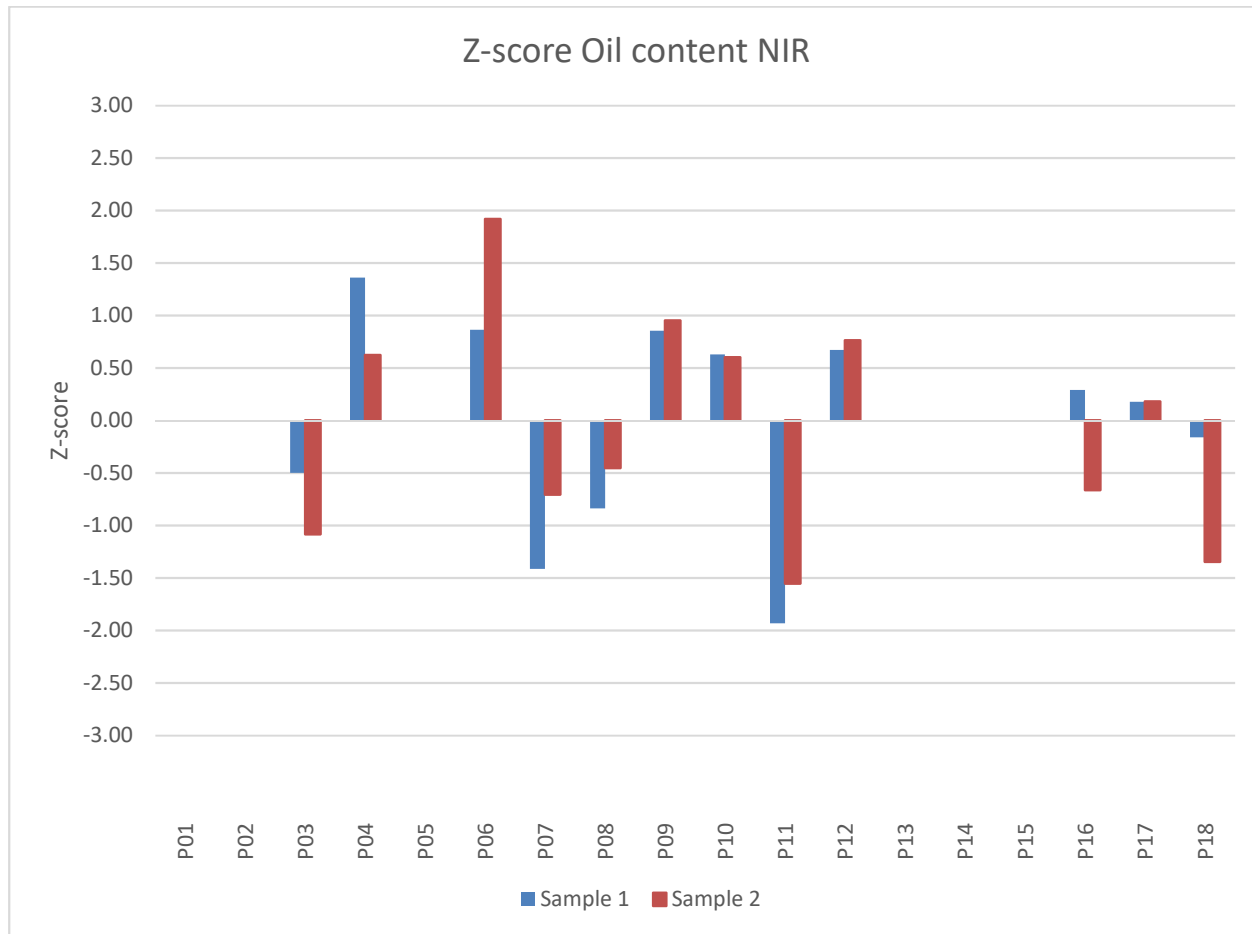


Table 6 Results and Z-scores for oil content solvent.

Lab number	Sample 1		Sample 2	
	Result	Z-score	Result	Z-score
P01				
P02				
P03	45.21	0.19	45.80	-0.15
P04				
P05				
P06	45.83	0.82	47.01	0.60
P07				
P08				
P09	44.84	-0.18	46.57	0.33
P10				
P11				
P12	45.43	0.41	46.54	0.31
P13				
P14				
P15				
P16	46.02	1.02	47.94	1.18
P17	44.75	-0.27	45.58	-0.29
P18	43.05	-1.99	42.85	-1.98
Assigned value	45.02		46.04	
Standard Deviation	0.99		1.61	
Count	7		7	

Figure 4 Z-scores for oil content by solvent extraction.

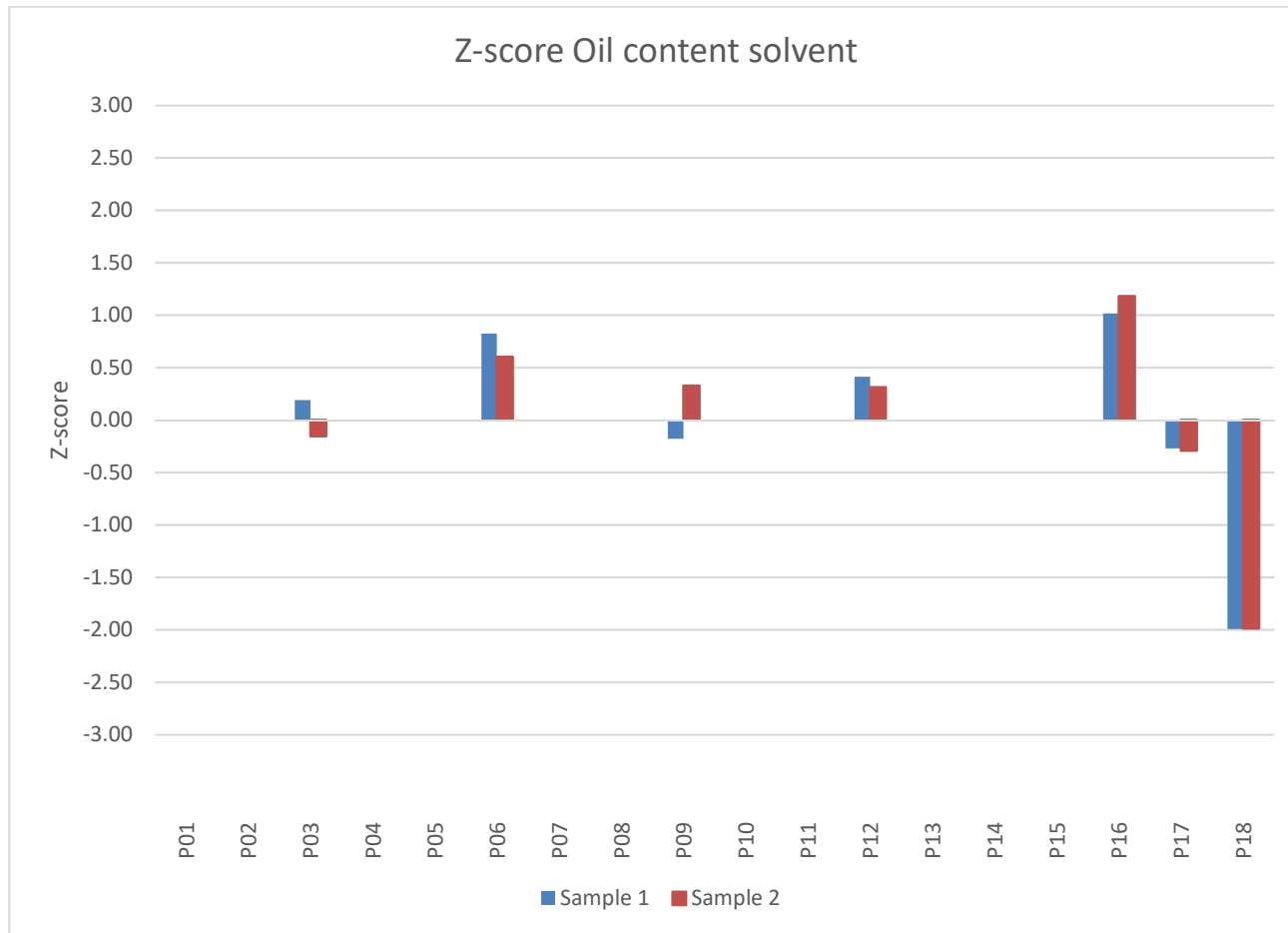


Table 7 Results and Z-scores for moisture content (NIR).

Moisture NIR (% by weight)				
Lab number	Sample 1		Sample 2	
	Result	Z-score	Result	Z-score
P01				
P02				
P03	5.50	-0.60	6.55	-1.08
P04	5.43	-0.93	6.62	-0.36
P05				
P06	5.33	-1.34		
P07	6.09	2.00	6.78	1.42
P08	5.80	0.72	6.75	1.14
P09	5.55	-0.38	6.55	-1.08
P10	5.40	-1.04	6.60	-0.52
P11	5.76	0.55	6.78	1.47
P12	5.72	0.37	6.65	0.03
P13				
P14				
P15				
P16	5.45	-0.82	6.55	-1.08
P17	5.75	0.50	6.60	-0.52
P18	5.85	0.94	6.70	0.59
Assigned value	5.64		6.65	
Standard Deviation	0.23		0.09	
Count	12		11	

Figure 5 Z-scores for moisture content by NIR.

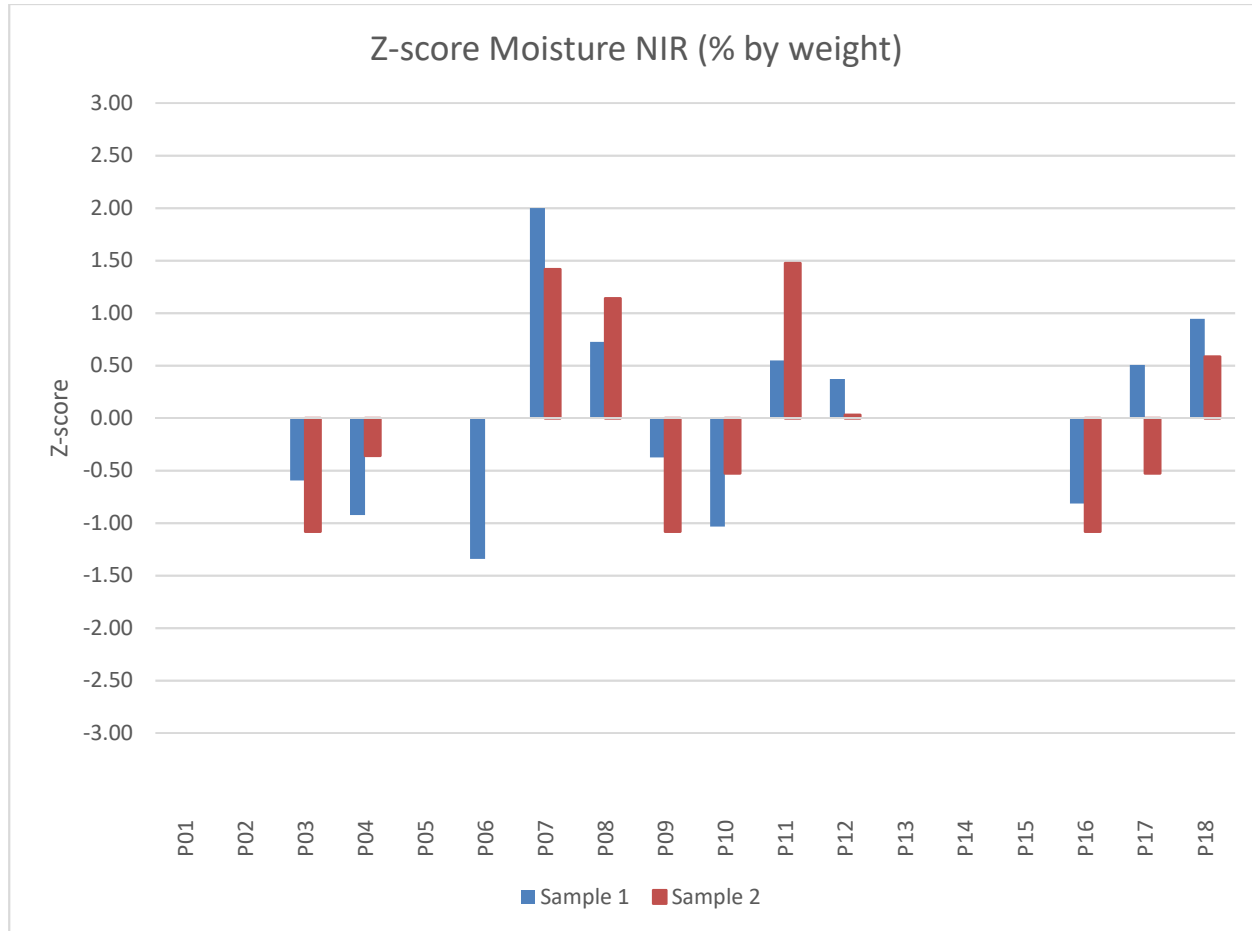


Table 8 Results and Z-scores for moisture content by oven.

Moisture Oven (% by weight)				
Lab number	Sample 1		Sample 2	
	Result	Z-score	Result	Z-score
P01				
P02				
P03	4.82	-1.78	6.04	-1.09
P04	5.90	0.84	6.87	0.83
P05				
P06	5.44	-0.27	6.52	0.01
P07	5.78	0.55	6.70	0.43
P08				
P09	4.93	-1.50	5.86	-1.52
P10				
P11	5.95	0.96	7.00	1.13
P12	5.68	0.31	6.53	0.03
P13				
P14				
P15				
P16	5.90	0.84	6.96	1.03
P17	5.83	0.67	6.76	0.56
P18	5.30	-0.61	5.90	-1.41
Assigned value	5.55		6.51	
Standard Deviation	0.42		0.43	
Count	10		10	

Figure 6 Z-scores for moisture content by oven.

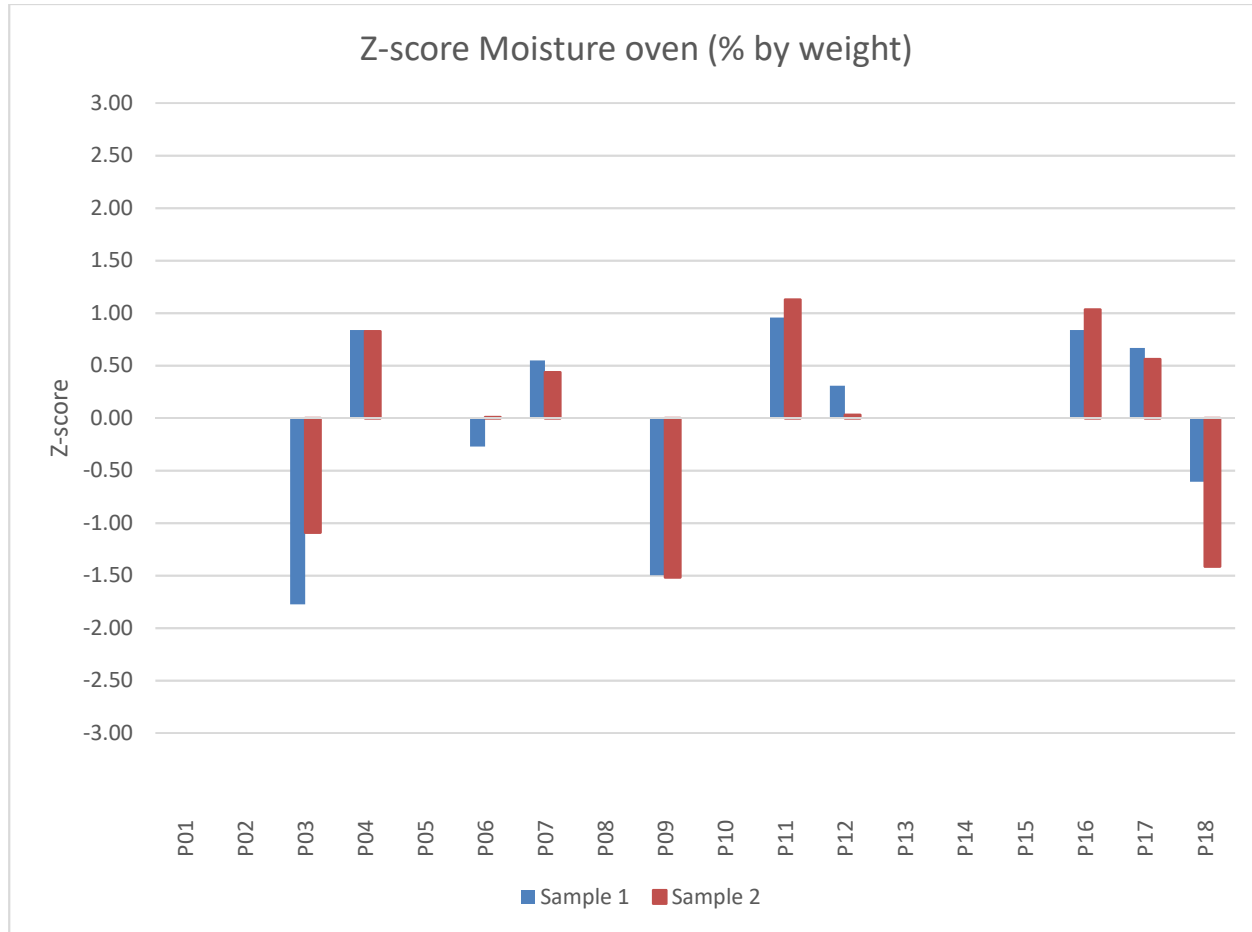


Table 9 Results and Z-scores for oleic acid.

Oleic acid (% of total fatty acids)				
Lab number	Sample 1		Sample 2	
	Result	Z-score	Result	Z-score
P01				
P02				
P03	60.71	-0.61	58.10	-1.13
P04				
P05				
P06	61.10	-0.31	59.03	-0.53
P07				
P08				
P09	63.68	1.70	61.83	1.28
P10				
P11				
P12	60.56	-0.73	59.66	-0.12
P13				
P14				
P15				
P16	60.51	-0.77	58.48	-0.88
P17	62.43	0.72	59.79	-0.04
P18	68.05	5.10	62.05	-1.41
Assigned value	61.50		59.85	
Standard Deviation	1.29		1.55	
Count	7		7	

Note - Laboratory number P18 Sample 1 was removed from assigned value calculation as the result was an outlier

Figure 7 Z-scores for oleic acid content.

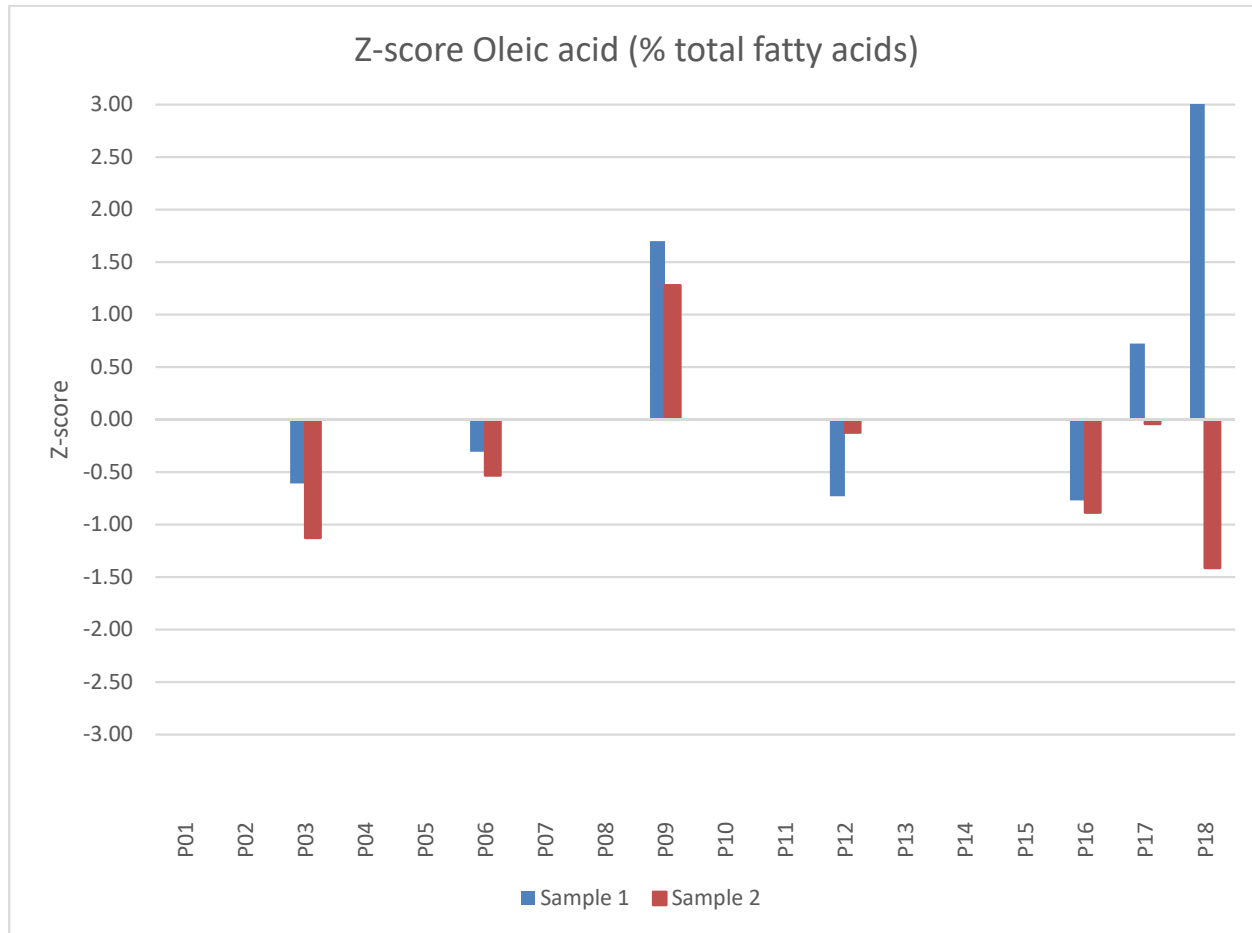


Table 10 Results and Z-scores for linoleic acid.

Linoleic acid (% of total fatty acids)				
Lab number	Sample 1		Sample 2	
	Result	Z-score	Result	Z-score
P01				
P02				
P03	20.03	0.63	22.15	0.54
P04				
P05				
P06	19.94	0.32	21.73	0.13
P07	-		-	
P08				
P09	19.49	-1.29	21.02	-0.55
P10				
P11				
P12	17.96	-6.76	19.72	-1.81
P13				
P14				
P15				
P16	20.18	1.16	21.95	0.35
P17	19.53	-1.17	21.52	-0.07
P18	19.95	0.35	23.05	1.41
Assigned value	19.85		21.59	
Standard Deviation	0.28		1.04	
Count	7		7	

Note - Laboratory number P12 Sample 1 was removed from assigned value calculation as the result was an outlier

Figure 8 Z-scores for linoleic acid content.

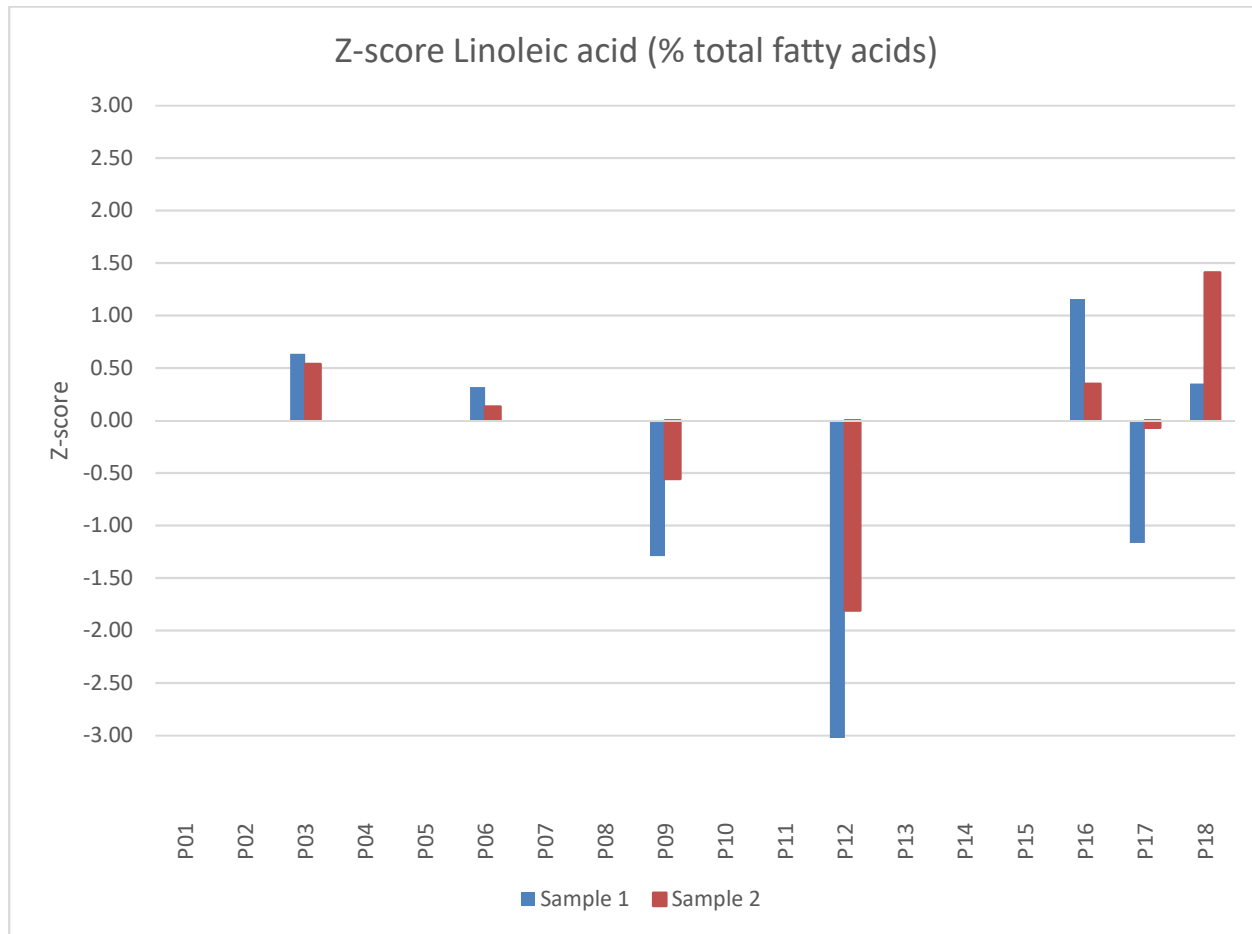


Table 11 Results and Z-scores for linolenic acid.

Linolenic acid (% of total fatty acids)				
Lab number	Sample 1		Sample 2	
	Result	Z-score	Result	Z-score
P01				
P02				
P03	9.88	0.03	10.18	0.15
P04				
P05				
P06	10.33	0.90	10.53	0.88
P07				
P08				
P09	9.90	0.08	10.09	-0.03
P10				
P11				
P12	8.87	-1.89	9.20	-1.88
P13				
P14				
P15				
P16	10.27	0.78	10.49	0.80
P17	9.92	0.10	10.15	0.08
P18	<0.05		<0.05	
Assigned value	9.86		10.11	
Standard Deviation	0.52		0.48	
Count	7		7	

Note - Laboratory number P18 Sample 1 and 2 were removed from assigned value calculation as the results were outliers.

Figure 9 Z-scores for linolenic acid content.

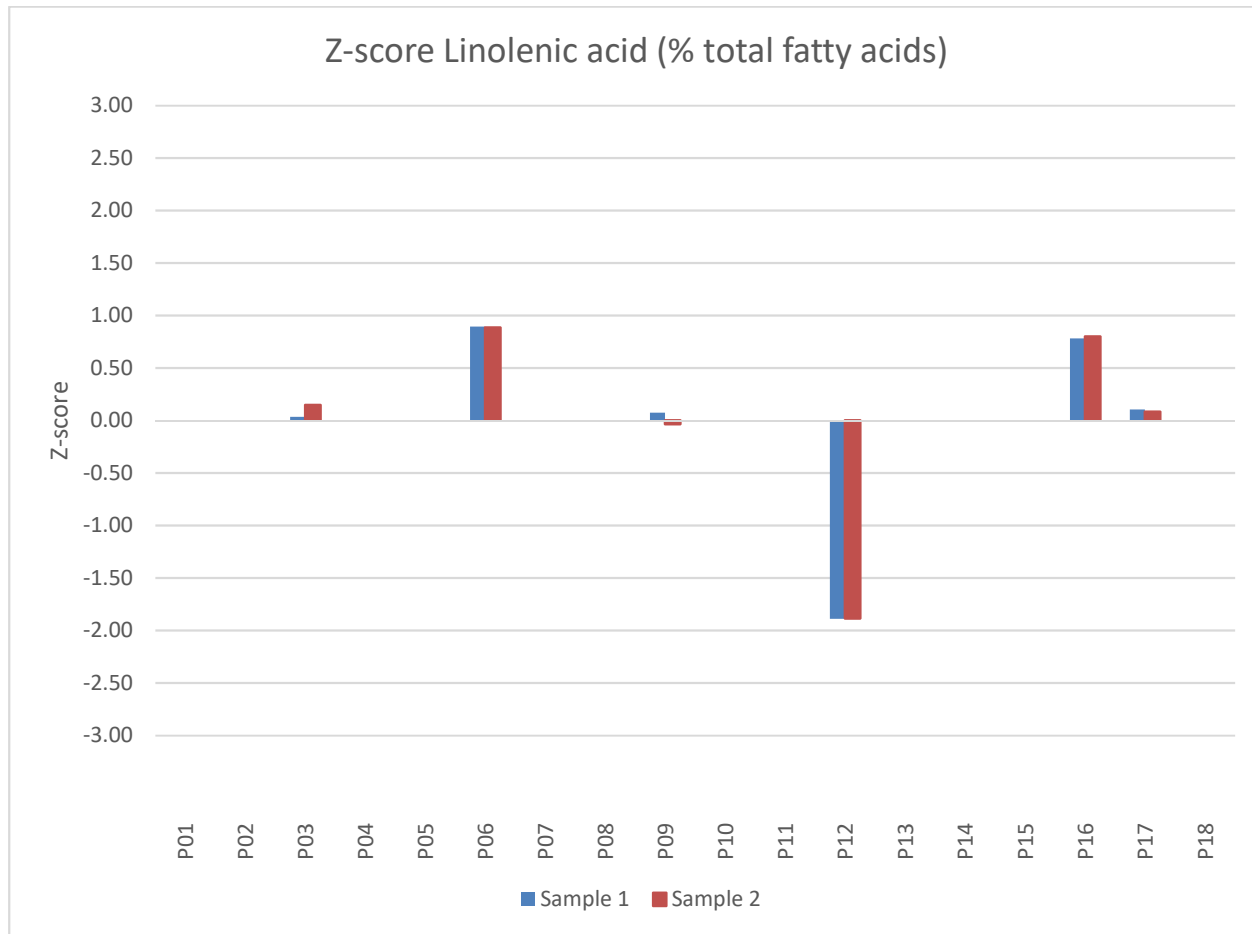
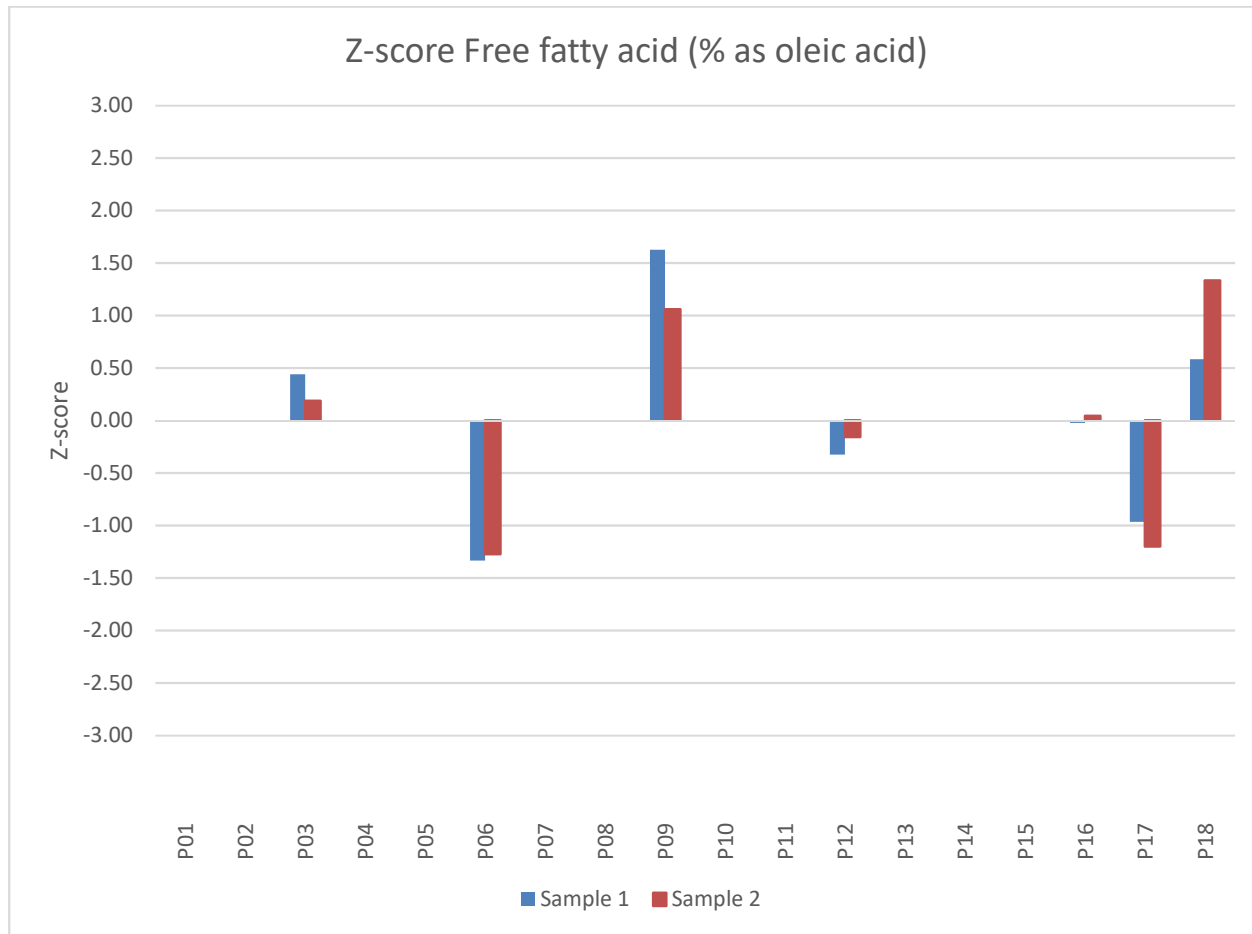


Table 12 Results and Z-scores for free fatty acids.

Free fatty acid (% as oleic acid)				
Lab number	Sample 1		Sample 2	
	Result	Z-score	Result	Z-score
P01				
P02				
P03	0.35	0.44	0.43	0.19
P04				
P05				
P06	0.09	-1.34	0.14	-1.27
P07				
P08				
P09	0.53	1.63	0.61	1.06
P10				
P11				
P12	0.24	-0.33	0.37	-0.16
P13				
P14				
P15				
P16	0.29	-0.02	0.41	0.04
P17	0.15	-0.97	0.16	-1.20
P18	0.38	0.58	0.67	1.33
Assigned value	0.29		0.40	
Standard Deviation	0.15		0.20	
Count	7		7	

Figure 10 Z-scores for free fatty acid content.



Appendix

Analytical methods used

Participating laboratories were asked to indicate which analytical methods were used for each determination. Information is summarised below (number of laboratories using method in brackets):

Test weight

Chondrometer (2), half litre measure (2), Test weight cup (1), GAFTA 25.0 (1), ISO7971-2 (1), not indicated (5).

Impurities

AOF 4-1.2(b)(2), AOF 4-1.3 (3), Screens and aspirator (1), ISO658:2002 (1), as per GTA (1), not indicated (4).

Oil content (NIR)

Calibration based on ISO659 (1), NIR (1), Infratec 1241 (1), NMR (1), not indicated (8).

Oil content (solvent)

ISO659:2009 (2), extract for 4,2,2 hours with regrind in between (1), AOF 4-1.24a (1), AOCS Af 3-54 (1), AOCS Am 2-93 (1), not indicated (1).

Moisture (NIR)

Calibration based on ISO665 (1), Infratec 1241 (1), NMR (1), not indicated (9).

Moisture (oven)

AOF 4-1.5 (130°C for 1 hour) (5), ISO665 (103°C for 3 hours, then 1 hour, 5g) (2), AACC 44-15A (130°C for 75 min) (1), not indicated (2).

Fatty acids (oleic, linoleic and linolenic acid)

IOC doc no. 24 (1), GC (1), ISO5508:1990 (1), AOCS Ce 1h-05 (1), AOAC 969.33 (1), GC-MS (1), not indicated (1).

Free fatty acids

AOCS Ac 5-41 (2), AOCS Ca 5a-40 (3), ISO660:2009 (1), Not indicated (1).