

REPORT NO. 1218

**Food Proficiency Testing Program
Round 44 – Wheat Flour**

October 2020

ACKNOWLEDGMENTS

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1. FOREWORD

This report summarises the results of a proficiency testing program involving the analysis of wheat flour samples. It constitutes the forty-fourth round of an ongoing series of programs involving chemical analysis of foodstuffs. This program is accredited to ISO/IEC 17043: 2010 “*Conformity assessment - General requirements for proficiency testing*” by International Accreditation New Zealand (IANZ).

Proficiency Testing Australia (PTA) conducted the testing program in July / August 2020. The aim of the program was to assess laboratories' ability to competently perform the nominated tests.

The Program Coordinator was Dr M Bunt. The Technical Advisers were Ms S Mott and Dr R Hutchinson, Global Proficiency Ltd (New Zealand). This report was authorised by Mr P Briggs, PTA General Manager.

2. FEATURES OF THE PROGRAM

- (a) A total of 9 laboratories participated in the program, all of which returned results for inclusion in the final report. Laboratories from the following countries participated:

8	AUSTRALIA
1	NEW ZEALAND

To ensure confidential treatment of results, each laboratory was allocated a unique code number. All reference to participants in this report is by allocated code numbers.

- (b) The results reported by participants are presented in Appendix A.
- (c) Laboratories were provided with two samples of approximately 100 g of wheat flour, labelled PTA 1 and PTA 2.
- (d) Participants were requested to determine the levels of:
- Protein
 - Moisture
 - Dietary Fibre
 - Energy
 - Total Fat
 - Ash
 - Carbohydrate

Laboratories were required to perform all tests using the routine test methods which would normally be used to test customer supplied samples.

- (e) Laboratories were requested to perform the tests according to the *Instructions to Participants* provided and to record the results, along with an estimate of their measurement uncertainty (MU) for each result, on the accompanying *Results Sheet*, which was distributed with the samples. Copies of these documents appear in Appendix C.
- (f) Prior to sample distribution, eight samples were analysed for homogeneity by Global Proficiency Ltd (New Zealand). An additional three samples were analysed for stability by Global Proficiency Ltd (New Zealand). Based on the results of this testing, the homogeneity and stability of the samples was established (see Appendix B).

3. FORMAT OF THE APPENDICES

- (a) Appendix A is divided into seven sections (A1–A7). These sections contain the analysis of results reported by laboratories for Protein, Total Fat, Moisture, Ash, Dietary Fibre, Carbohydrate and Energy.

Each section contains, where appropriate:

- i) a table of results reported by laboratories, with estimates of their MUs;
 - ii) a table of calculated z-scores and methods used;
 - iii) a listing of the summary statistics; and
 - iv) ordered z-score charts.
- (b) Appendix B contains details of the homogeneity and stability testing.
- (c) Appendix C contains copies of the *Instructions to Participants* and *Results Sheet*.

4. STATISTICAL DESIGN OF THE PROGRAM

The summary statistics calculated for each test / sample consists of:

- *No. of Results*: the total number of results for that test / sample;
- *Median*: the middle value of the results;
- *Normalised IQR*: the normalised interquartile range of the results;
- *Uncertainty of the Median*: a robust estimate of the standard deviation of the *Median*;
- *Robust CV*: the robust coefficient of variation expressed as a percentage, *i.e.* $100 \times \text{Normalised IQR} / \text{Median}$;
- *Minimum*: the lowest laboratory result;
- *Maximum*: the highest laboratory result; and
- *Range*: the difference between the *Maximum* and *Minimum*.

Summary Statistics

The median is a measure of the centre of the data.

The normalised IQR is a measure of the spread of the results. It is calculated by multiplying the interquartile range (IQR) by a correction factor, which converts the IQR to an estimate of the standard deviation. The IQR is the difference between the upper and lower quartiles (*i.e.* the values above and below which a quarter of the results lie, respectively).

For normally distributed data, the uncertainty of the median is approximated by:

$$\sqrt{\frac{\pi}{2}} \times \frac{normIQR}{\sqrt{n}}$$

where *normIQR* is the normalised IQR and *n* is the number of results.

Z-Scores

In order to assess laboratories' testing performance, a robust statistical approach, using z-scores, was utilised. Z-scores give a measure of how far a result is from the consensus value (*i.e.* the median) and gives a "score" to each result relative to the other results in the group.

A z-score with an absolute value less than or equal to 2.0 is considered to be satisfactory, whereas, a z-score with an absolute value greater than or equal to 3.0 is considered to be an outlier and is marked by the symbol "§". Laboratories are also encouraged to review results which have an absolute z-score value between 2.0 and 3.0 (*i.e.* $2.0 < |z\text{-score}| < 3.0$). These results are considered to be questionable results.

Ordered Z-Score Charts

Ordered z-score charts indicate each laboratory's robust z-score, in order of magnitude, marked with its laboratory code number. From these charts, each laboratory can readily compare its performance relative to the other laboratories.

The ordered z-score charts in Appendix A are limited on the vertical axis to +3.0 and -3.0, so that outliers are clearly identifiable as those laboratories whose "bar" extends beyond the chart boundary.

For further details on the calculation and interpretation of robust z-scores and ordered z-score charts, please see the *Guide to Proficiency Testing Australia (2019)*.

5. OUTLIER RESULTS

The following table summarises the results submitted by participants for the program.

Table A: Summary Statistics for All Tests

Test	Summary Statistics	Sample PTA 1	Sample PTA 2
Protein (N x 5.7) (g/100g)	Number of Results	9	9
	Median	11.75	11.75
	Normalised IQR	0.22	0.17
	Uncertainty (Median)	0.09	0.07
Total Fat (g/100g)	Number of Results	8	8
	Median	1.730	1.725
	Normalised IQR	0.230	0.233
	Uncertainty (Median)	0.102	0.103
Moisture (g/100g)	Number of Results	9	9
	Median	12.45	12.40
	Normalised IQR	0.55	0.50
	Uncertainty (Median)	0.23	0.21
Ash (g/100g)	Number of Results	9	9
	Median	0.705	0.700
	Normalised IQR	0.048	0.031
	Uncertainty (Median)	0.020	0.013
Dietary Fibre (g/100g)	Number of Results	6	6
	Median	3.790	3.665
	Normalised IQR	0.878	0.899
	Uncertainty (Median)	0.449	0.460
Carbohydrate (g/100g)	Number of Results	7	7
	Median	69.40	69.50
	Normalised IQR	1.15	1.19
	Uncertainty (Median)	0.54	0.57
Energy (kJ/100g)	Number of Results	7	7
	Median	1474.5	1476.5
	Normalised IQR	10.4	12.4
	Uncertainty (Median)	4.9	5.9

Notes:

1. For each test, the results for all test methods were pooled and the summary statistics, above, are for the pooled results.
2. Summary statistics were calculated for the average result for each sample.

Table B: Summary of Statistical Outliers

The following table lists the laboratories (by code number) that obtained outliers for each test.

Test	Sample PTA 1	Sample PTA 2
Protein	1	1
Total Fat	-	-
Moisture	-	-
Ash	7	-
Dietary Fibre	1	-
Carbohydrate	7	7
Energy	7	7

Note:

1. A target CV of 12.2% was used to calculate the z-scores for Dietary Fibre for both samples.

6. PTA AND TECHNICAL ADVISERS' COMMENTS

Consensus values (medians), derived from participants' results, are used as the assigned values in this program. These values are not metrologically traceable to an external reference.

The summary statistics, uncertainties of the assigned values and outliers, for each of the tests, are reported in Tables A and B above.

Complete details of the statistical analyses appear in Appendix A.

6.1 Return Rate

All nine laboratories that participated in the program submitted results. Six of these nine laboratories (67%) provided results for all of the tests.

The return rate for all tests is as follows:

• Protein	9 out of 9	100%
• Total Fat	8 out of 9	89%
• Moisture	9 out of 9	100%
• Ash	9 out of 9	100%
• Dietary Fibre	6 out of 9	67%
• Carbohydrate	7 out of 9	78%
• Energy	7 out of 9	78%

6.2 Performance Summary

One or more statistical outliers were reported by two of the nine laboratories (22%) that returned results in this round of the Food program. The last round of the Food program where wheat flour samples were used was Round 42 (see Report No. 1104). For comparison, 33% of the participants in Round 42 of the Food program reported statistical outliers.

A total of 110 results were analysed in this proficiency round. Of these results, eight (7%) were outlier results. In Round 42 of the Food program, 5% of the total results reported were outlier results (see Report No. 1104).

6.3 Protein

Of the nine laboratories that tested the samples for Protein, three used AOAC 2001.11 (Kjeldahl digestion). Four laboratories used AOAC 992.23 or AOAC 990.03 (Dumas combustion). One laboratory used a method other than those listed in the Instructions to Participants, but did not specify the method used. One laboratory did not specify a method code but did indicate the method they used for testing. This method was not recognised. This laboratory also indicated that they used EDTA as the Dumas calibrating material, so it was assumed that the method this laboratory used was AOAC 992.23 or AOAC 990.03 (Dumas combustion). All methods were pooled to analyse the Protein results.

The robust CVs of 1.9% and 1.5% for the two samples are lower than the values of 3.6% and 2.8% obtained in Round 42 of the Food program (see Report No. 1104).

The pooled results had low CVs with tight agreement between Kjeldahl and Dumas (with the latter very slightly higher and similar calibrant), and measures Z, r and R passed. "Method Other" was high by both z-score and MU.

Laboratory code 1 reported outlier results for both samples. Laboratory code 3 obtained absolute z-scores between 2.0 and 3.0 for both samples.

Confidence in the medians can be expressed as the uncertainty of the median (as defined in page 3 of this report), which was calculated for each test. For the Protein testing, the median and associated standard error (se) for each sample (expressed in g/100g) was as follows:

	PTA 1	PTA 2
Protein, all methods pooled	11.75 ± 0.09	11.75 ± 0.07

Figure TA-1, below, shows the distribution of all results from the methods used for Protein testing in this round.

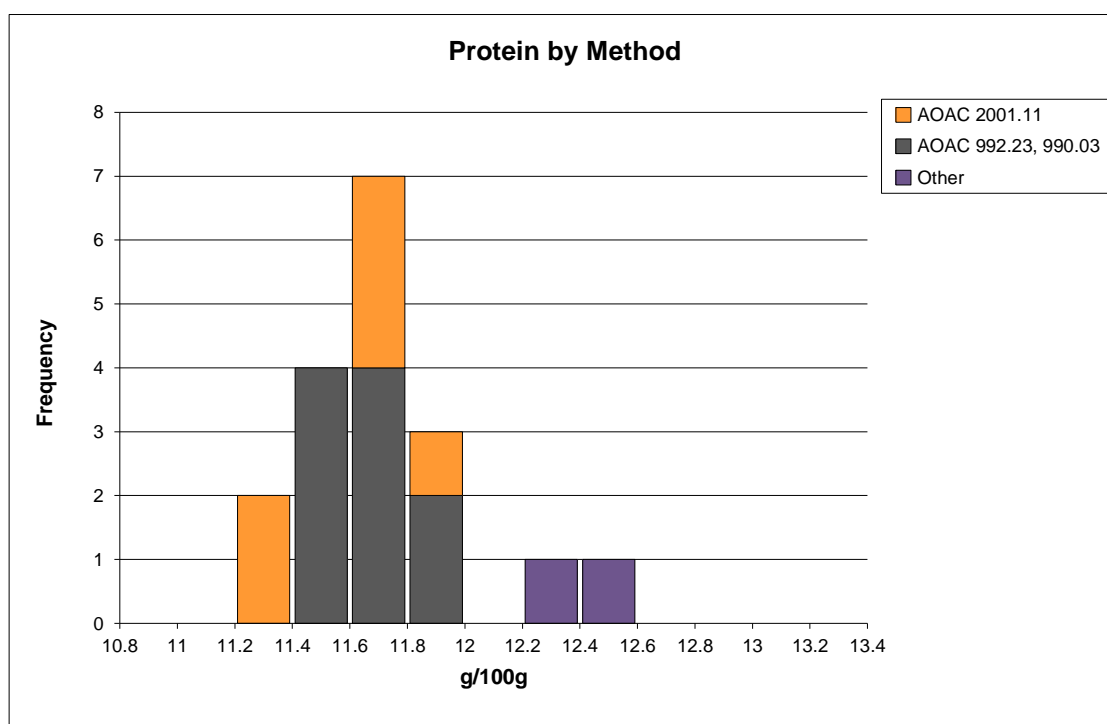


Figure TA-1. Spread of all results for Protein testing of duplicate wheat flour samples PTA 1 and PTA 2.

For this proficiency round, laboratories were requested to report their MU by repeatability (r) and / or reproducibility (R). One laboratory reported MU for Protein by repeatability. Seven laboratories reported both repeatability and reproducibility MU for Protein. One laboratory did not provide an estimate of the MU for their Protein results.

Laboratories whose measurement uncertainty range encompassed the median or were within the standard error of the median range are considered an accurate representation of the laboratory's uncertainty of measurement.

6.4 Total Fat

Eight laboratories tested the samples for Total Fat. Of these laboratories, six tested using acid hydrolysis. One laboratory tested using ISO 11085: 2008 (Randall extraction method). One laboratory did not specify a method code but did indicate the method they used for testing. This method was not recognised. All methods were pooled to analyse the Total Fat results.

The robust CVs of 13.3% and 13.5% for the two samples are higher than the values of 11.3% and 9.9% obtained in Round 42 of the Food program (see Report No. 1104).

The pooled results had slightly high CVs as a result of two distributions with acid hydrolysis considerably, 0.35%, higher than ISO 11085 (Randall extraction) and measures Z, r and R passed.

There were no outlier results reported for either sample.

Confidence in the medians can be expressed as the uncertainty of the median (as defined in page 3 of this report), which was calculated for each test. For the Total Fat testing, the median and associated standard error (se) for each sample (expressed in g/100g) was as follows:

	PTA 1	PTA 2
Total Fat, all methods pooled	1.730 ± 0.102	1.725 ± 0.103

Figure TA-2, below, shows the distribution of all results from the methods used for Total Fat testing in this round.

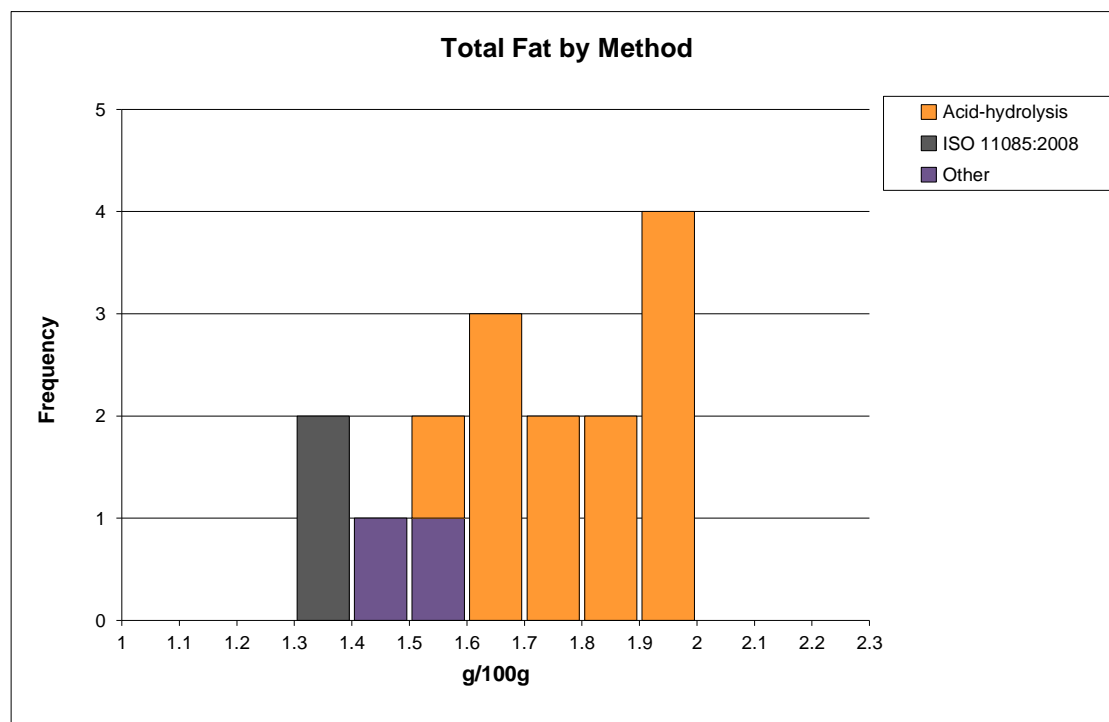


Figure TA-2. Spread of all results for Total Fat testing of duplicate wheat flour samples PTA 1 and PTA 2.

For this proficiency round, laboratories were requested to report their MU by repeatability (r) and / or reproducibility (R). One laboratory reported MU for Total Fat by repeatability. Six laboratories reported both repeatability and reproducibility MU for Total Fat. One laboratory did not provide an estimate of the MU for their Total Fat results.

Laboratories whose measurement uncertainty range encompassed the median or were within the standard error of the median range are considered an accurate representation of the laboratory's uncertainty of measurement.

6.5 Moisture

Of the nine laboratories that tested the samples for Moisture, four used AOAC 925.10. Four laboratories used the AACCI Method 44-15.02 (Air-Oven). One laboratory did not specify a method code but did indicate the method they used for testing. This method was not recognised.

The time and temperatures used for Moisture determination ranged between four hours at 103 °C to 1.5 hours at 130 °C. The majority of laboratories dried at 130 °C for one hour.

All methods were pooled to analyse the Moisture results.

The robust CVs of 4.4% and 4.1% for the two samples compare well with the values of 4.6% and 4.9% obtained in Round 42 of the Food program (see Report No. 1104).

The pooled results had slightly high CVs per low to high temperatures of drying 103 - 130 °C per different test purposes. This is from competing rates of weight loss from (a) moisture partly bound and (b) moisture generated at higher temperature e.g. from protein - carbohydrate reaction. Measures Z, and r all passed, and some R missed or failed to pass (this may reflect complications in an otherwise simple method).

There were no outlier results reported for either sample.

Confidence in the medians can be expressed as the uncertainty of the median (as defined in page 3 of this report), which was calculated for each test. For the Moisture testing, the median and associated standard error (se) for each sample (expressed in g/100g) was as follows:

	PTA 1	PTA 2
Moisture, all methods pooled	12.45 ± 0.23	12.40 ± 0.21

Figure TA-3, below, shows the distribution of all results from the methods used for Moisture testing in this round.

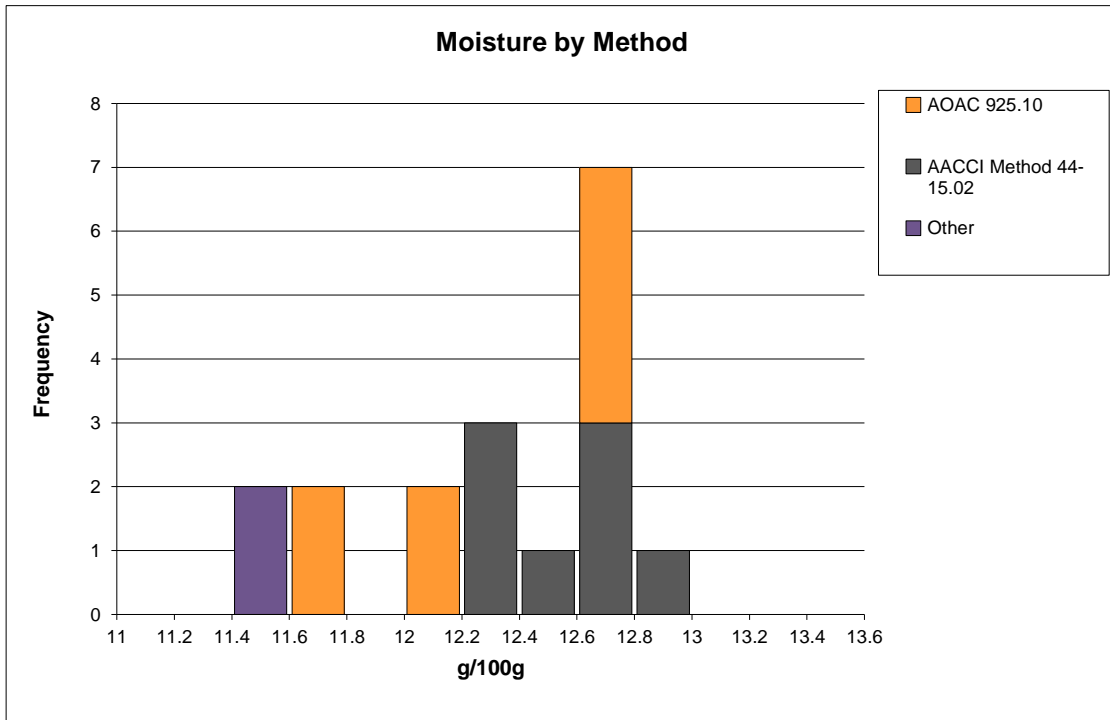


Figure TA-3. Spread of all results for Moisture testing of duplicate wheat flour samples PTA 1 and PTA 2.

Figure TA-4, below, shows the distribution of all results from the various temperature / time combinations used for Moisture testing in this round.

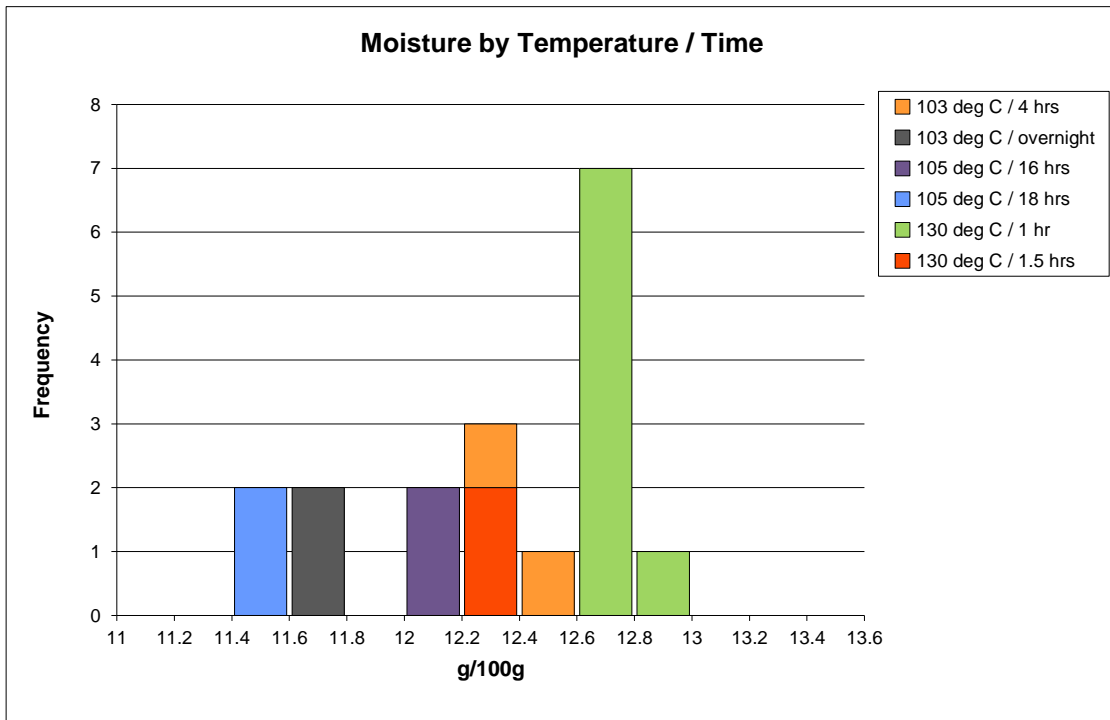


Figure TA-4. Spread of all results for Moisture testing from the various temperature / time combinations used in the testing of duplicate wheat flour samples PTA 1 and PTA 2.

For this proficiency round, laboratories were requested to report their MU by repeatability (r) and / or reproducibility (R). One laboratory reported MU for Moisture by repeatability. Seven laboratories reported both repeatability and reproducibility MU for Moisture. One laboratory did not provide an estimate of their MU for this test.

Laboratories whose measurement uncertainty range encompassed the median or were within the standard error of the median range are considered an accurate representation of the laboratory's uncertainty of measurement.

6.6 Ash

Nine laboratories tested the samples for Ash. Of these, six used AOAC 923.03. Two laboratories used the AACCI Method 08-01.01. One laboratory did not specify a method code but did indicate the method they used for testing. This method was not recognised.

The temperatures used for ashing ranged between 550 °C and 600 °C. The time for ashing ranged between one hour to 18 hours.

All methods were pooled to analyse the Ash results.

The robust CVs were 6.8% and 4.4% for the two samples. The robust CV for sample PTA 1 is higher than the values of 4.5% and 4.9% obtained in Round 42 of the Food program, while the robust CV for sample PTA 2 compares well with these values (see Report No. 1104).

The pooled results had slightly high CVs resulting from a continuous increase in result with increase in ashing temperature changes, from 550 to 600 °C, as shown in Figure TA-6. There were resulting problems for measures relating to this - for Z, r and R.

Laboratory code 7 reported an outlier result sample PTA 1 and an absolute z-score between 2.0 and 3.0 for sample PTA 2. Laboratory code 3 obtained absolute z-scores between 2.0 and 3.0 for both samples.

Confidence in the medians can be expressed as the uncertainty of the median (as defined in page 3 of this report), which was calculated for each test. For Ash testing, the median and associated standard error (se) for each sample (expressed in g/100g) was as follows:

	PTA 1	PTA 2
Ash, all methods pooled	0.705 ± 0.020	0.700 ± 0.013

Figure TA-5, below, shows the distribution of all results from the methods used for Ash testing in this round.

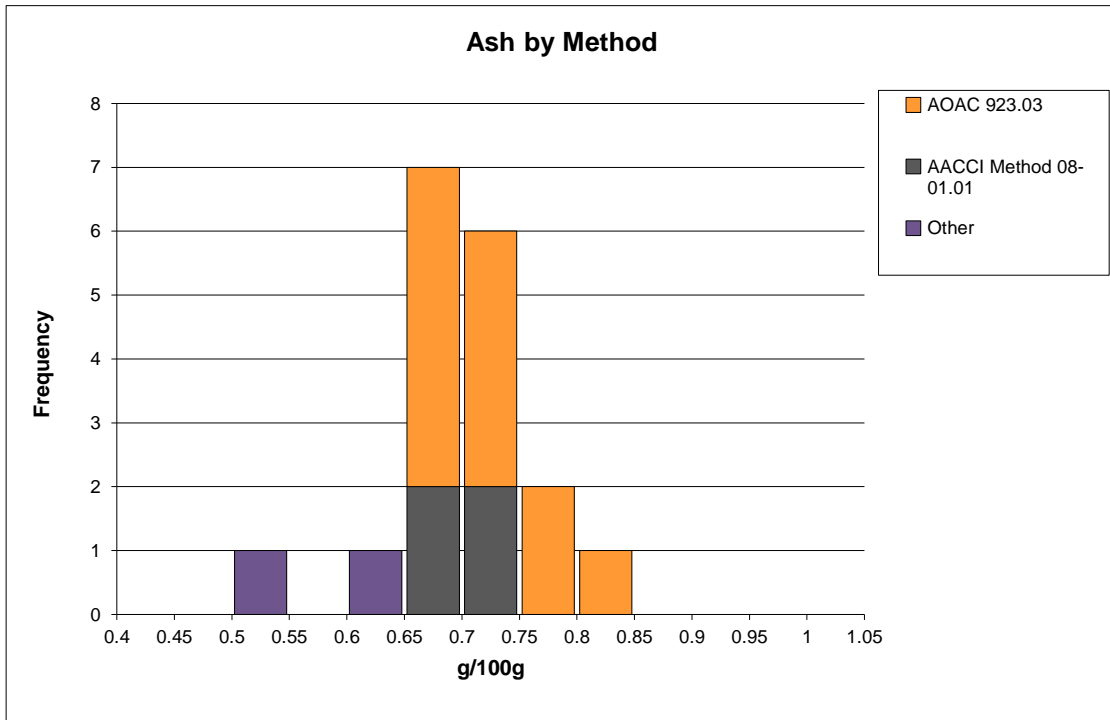


Figure TA-5. Spread of all results for Ash testing of duplicate wheat flour samples PTA 1 and PTA 2.

Figure TA-6, below, shows the distribution of all results from the various temperature / time combinations used for Ash testing in this round.

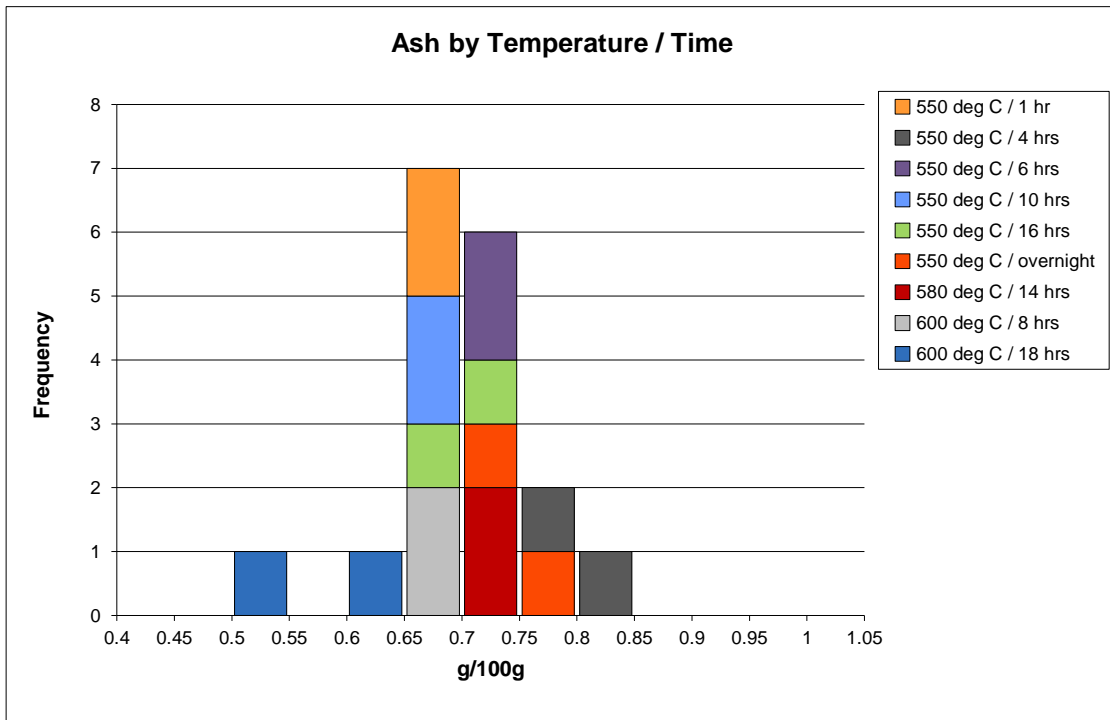


Figure TA-6. Spread of all results for Ash testing from the various temperature / time combinations used in the testing of duplicate wheat flour samples PTA 1 and PTA 2.

For this proficiency round, laboratories were requested to report their MU by repeatability (r) and / or reproducibility (R). One laboratory reported MU for Ash by repeatability. Six laboratories reported both repeatability and reproducibility MU for Ash. Two laboratories did not provide an estimate of the MU for their Ash results.

Laboratories whose measurement uncertainty range encompassed the median or were within the standard error of the median range are considered an accurate representation of the laboratory's uncertainty of measurement.

6.7 Dietary Fibre

Of the six laboratories that tested the samples for Dietary Fibre, two used AOAC 985.29 (Prosky). Two laboratories used AOAC 991.43 (Lee). One laboratory used a combination of AOAC 985.29 (Prosky), AOAC 991.42, AOAC 991.43 (Lee) and AOAC 993.19. One laboratory used rapid integrated AACCC 32.06.01. All methods were pooled to analyse the Dietary Fibre results.

The robust CVs were 23.2% and 24.5% for the two samples. These values were considered to be too high to analyse the Dietary Fibre results. Therefore, a target CV was used to calculate the robust z-scores for both samples. The target CV chosen for both samples was 12.2%. This is the same target CV as that used to analyse the Dietary Fibre results in Round 42 of the Food program (see Report No. 1104).

Laboratory code 1 reported an outlier for sample PTA 1. Laboratory code 9 obtained an absolute z-score between 2.0 and 3.0 for sample PTA 2.

Results are expected to be dependent on severity of hydrolysis (per different purposes). Apart from resulting z-score differences, there appeared to be differences in the case of some r and R values, as shown in the tables. This had the largest SD value of these tests and therefore most of the effect on Carbohydrate.

Confidence in the medians can be expressed as the uncertainty of the median (as defined in page 3 of this report), which was calculated for each test. For the Dietary Fibre testing, the median and associated standard error (se) for each sample (expressed in g/100g) was as follows:

	PTA 1	PTA 2
Dietary Fibre, all methods pooled	3.790 ± 0.449	3.665 ± 0.460

Figure TA-7 shows the distribution of all results from the methods used for Dietary Fibre testing in this round.

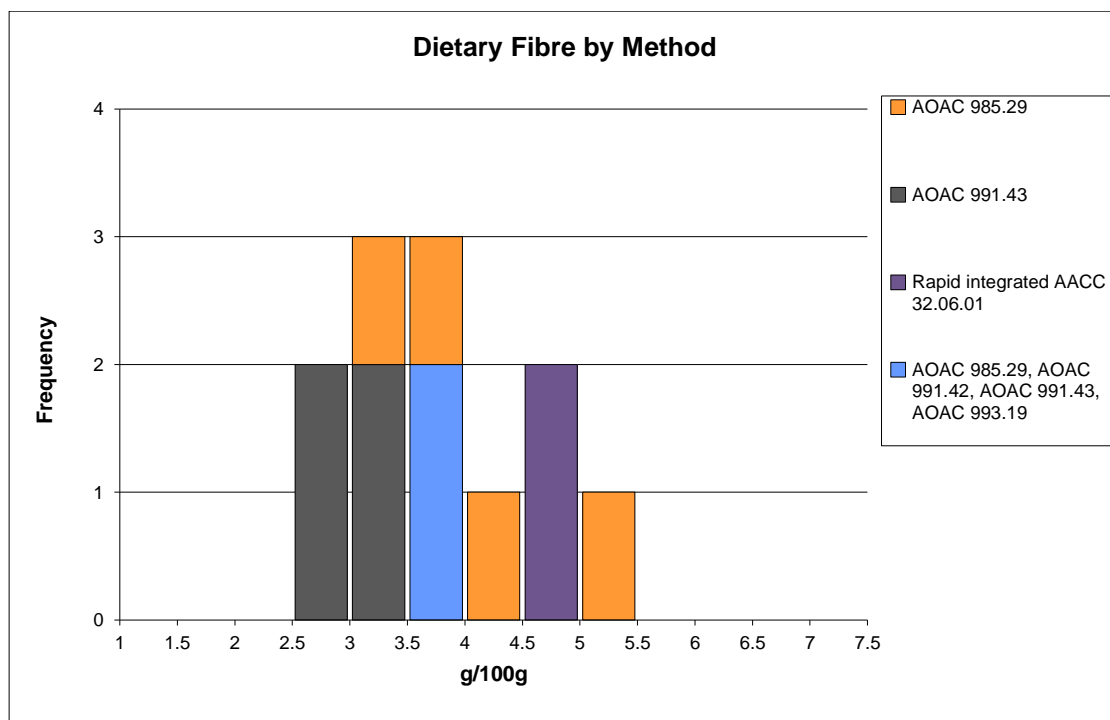


Figure TA-7. Spread of all results for Dietary Fibre testing of duplicate wheat flour samples PTA 1 and PTA 2.

For this proficiency round, laboratories were requested to report their MU by repeatability (r) and / or reproducibility (R). Six laboratories reported both repeatability and reproducibility MU for Dietary Fibre

Laboratories whose measurement uncertainty range encompassed the median or were within the standard error of the median range are considered an accurate representation of the laboratory’s uncertainty of measurement.

6.8 Carbohydrate

Since November 2001, the Australia New Zealand Food Standards Code (FSC 1.2.8, 1) has defined Carbohydrate as the difference from 100 of Protein, Total Fat, Moisture, Ash and Dietary Fibre (and alcohol and any other unavailable carbohydrates). That is, Dietary Fibre is included in the difference calculation. So the equation for Carbohydrate value calculation for food labelling should be:

$$100 - \text{Protein} - \text{Total Fat} - \text{Moisture} - \text{Ash} - \text{Dietary Fibre}.$$

Seven laboratories reported results for Carbohydrate. Six of these laboratories reported results for Dietary Fibre and, therefore, calculated their Carbohydrate results following FSC 1.2.8, 1. One laboratory that reported results for Carbohydrate did not report results for Dietary Fibre and, therefore, did not calculate their Carbohydrate results following FSC 1.2.8, 1.

The robust CVs of 1.7% and 1.7% for the two samples are lower than the values of 2.7% and 1.9% obtained in Round 42 of the Food program (see Report No. 1104).

Laboratory code 7 reported outlier results for both samples.

Determination of Carbohydrate is by calculation from analyses above. Results have close agreement according to calculation with Dietary Fibre Robust vs Carbohydrate (CV 23.2, 24.5% vs 1.7%, 1.7%) (Normalised IQE 0.878, 0.899 vs 1.15, 1.19). There was agreement around 69.4 units except for “other” results 5-6 units higher (see graphs giving one z-score alert). For MU there were no r problems, however several R values were not reported.

Confidence in the medians can be expressed as the uncertainty of the median (as defined in page 3 of this report), which was calculated for each test. For the Carbohydrate testing, the median and associated standard error (se) for each sample (expressed in g/100g) was as follows:

	PTA 1	PTA 2
Carbohydrate	69.40 ± 0.54	69.50 ± 0.57

Figure TA-8, below, shows the distribution of all results for Carbohydrate testing in this round.

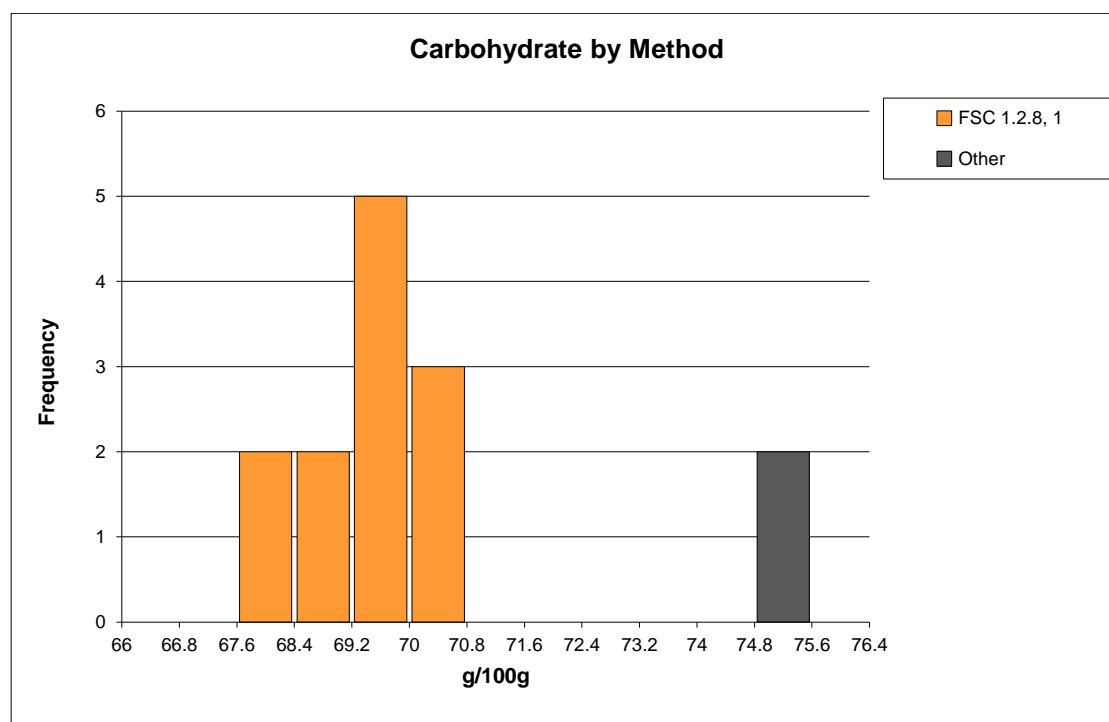


Figure TA-8. Spread of all results for Carbohydrate testing of duplicate wheat flour samples PTA 1 and PTA 2.

For this proficiency round, laboratories were requested to report their MU by repeatability (r) and / or reproducibility (R). One laboratory reported MU for Carbohydrate by repeatability. Four laboratories reported both repeatability and reproducibility MU for Carbohydrate. Two laboratories did not provide an estimate of the MU for their Carbohydrate results.

Laboratories whose measurement uncertainty range encompassed the median or were within the standard error of the median range are considered an accurate representation of the laboratory’s uncertainty of measurement.

6.9 Energy

The November 2001 changes to the FSC ascribed an average energy value to Dietary Fibre of 8 kJ/g. So the equation for Energy value calculation for food labelling (FSC 1.2.8, 2(2)) should be:

$$\text{Protein} \times 17 + \text{Total Fat} \times 37 + \text{Carbohydrate} \times 17 + \text{Dietary Fibre} \times 8.$$

Seven laboratories reported results for Energy. Six of these laboratories reported results for Dietary Fibre and, therefore, calculated their Energy results following FSC 1.2.8, 2(2). One laboratory that reported results for Energy did not report results for Dietary Fibre and, therefore, did not calculate their Energy results following FSC 1.2.8, 2(2).

The robust CVs of 0.7% and 0.8% for the two samples are lower than the values of 1.4% and 1.2% obtained in Round 42 of the Food program (see Report No. 1104).

Laboratory code 7 reported outlier results for both samples.

Determination of Energy is by calculation only from analyses above. Results have surprisingly close agreement according to the above and calculation with Carbohydrate, etc., with slightly fewer close agreements than this. There was agreement around 1474.5 units except for "other" results 56 units higher (see graphs giving one z-score alert). For MU there were no problems except several r and R values were missed.

Confidence in the medians can be expressed as the uncertainty of the median (as defined in page 3 of this report), which was calculated for each test. For the Energy testing, the median and associated standard error (se) for each sample (expressed in kJ/100g) was as follows:

	PTA 1	PTA 2
Energy	1474.5 ± 4.9	1476.5 ± 5.9

Figure TA-9, below, shows the distribution of all results for Energy testing in this round.

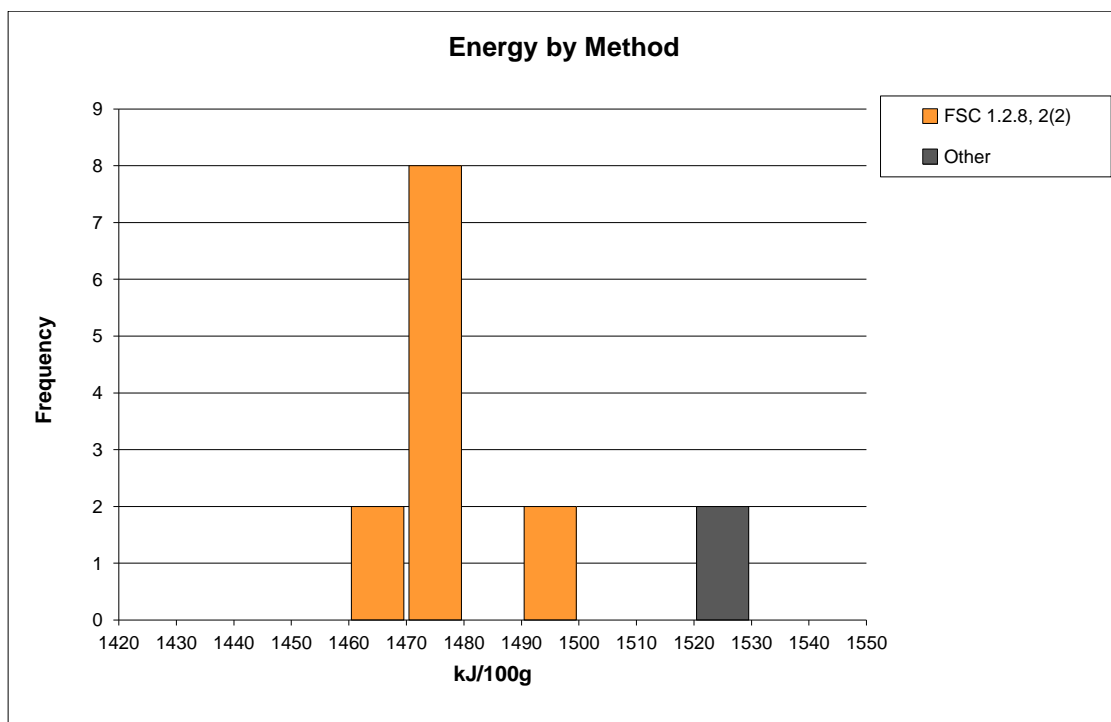


Figure TA-9. Spread of all results for Energy testing of duplicate wheat flour samples PTA 1 and PTA 2.

For this proficiency round, laboratories were requested to report their MU by repeatability r and / or reproducibility R . One laboratory reported MU for Energy by repeatability. Five laboratories reported both repeatability and reproducibility MU for Energy. One laboratory did not provide an estimate of the MU for their Energy results.

Laboratories whose measurement uncertainty range encompassed the median or were within the standard error of the median range are considered an accurate representation of the laboratory's uncertainty of measurement.

6.10 Measurement Uncertainty

For this proficiency round, laboratories were requested to report their MU by repeatability r and / or reproducibility R for each test result. The proportion of MU estimates returned for each individual test is as follows:

<u>Test</u>	<u>Repeatability (r)</u>		<u>Reproducibility (R)</u>	
Protein	8 out of 9	89%	7 out of 9	78%
Total Fat	7 out of 8	88%	6 out of 8	75%
Moisture	8 out of 9	89%	7 out of 9	78%
Ash	7 out of 9	78%	6 out of 9	67%
Dietary Fibre	6 out of 6	100%	6 out of 6	100%
Carbohydrate	5 out of 7	71%	4 out of 7	57%
Energy	6 out of 7	86%	5 out of 7	71%

Participants were also asked to describe the method used for estimating their MU. Eight laboratories provided this information, which can be found in Table C below.

Table C: Method of Measurement Uncertainty Estimation

Lab Code	Method
1	MU by PT data.
2	In-house precision data.
4	Measurement uncertainty: Bottom up.
5	Proficiency trial data.
6	GUM (Bottom Up).
7	GUM.
8	$Mu_r = \text{NORTEST}$. $Mu_R = \text{Proficiency}$.
9	Combination of proficiency trial data and in-house precision data.

7. REFERENCES

1. *Guide to Proficiency Testing Australia (2019)*. (This document is located on the PTA website at www.pta.asn.au under Programs / Documents).
2. *ISO/IEC 17043: 2010. Conformity assessment – General requirements for proficiency testing*.
3. *AOAC 2001.11. Protein (Crude) in Animal Feed, Forage (Plant Tissue), Grain, and Oilseeds. Block Digestion Method Using Copper Catalyst and Steam Distillation into Boric Acid*.
4. *AOAC 990.03. Protein (Crude) in Animal Feed. Combustion Method*.
5. *AOAC 992.23. Crude Protein in Cereal Grains and Oilseeds. Generic Combustion Method*.
6. *ISO 11085: 2008. Cereals, cereals-based products and animal feeding stuffs – Determination of crude fat and total fat content by the Randall extraction method*.
7. *AOAC 925.10. Solids (total) and loss on drying (moisture) in flour. Air oven method*.
8. *AACCI Method 44-15.02. Moisture – Air-Oven Methods*.
9. *AOAC 923.03. Ash of Flour. Direct Method*.
10. *AACCI Method 08-01.01. Ash – Basic Method*.
11. *AOAC 985.29. Total Dietary Fibre in Foods. Enzymatic-Gravimetric Method*.
12. *AOAC 991.42. Insoluble Dietary Fibre in Foods and Food Products. Enzymatic-Gravimetric Method*.
13. *AOAC 991.43. Total, Soluble and Insoluble Dietary Fibre in Foods. Enzymatic-Gravimetric Method, MES-TRIS Buffer*.
14. *AOAC 993.19. Soluble Dietary Fibre in Food and Food Products. Enzymatic-Gravimetric Method*.
15. *Australia New Zealand Food Standards Code – Standard 1.2.8 – Nutrition Information Requirements*.

APPENDIX A

Summary of Results

Section A1

Protein

A1.1

Wheat Flour – Protein (g/100g) Results and Measurement Uncertainty

Lab Code	Sample PTA 1				Sample PTA 2			
	Result 1	Result 2	MU r (±)	MU R (±)	Result 1	Result 2	MU r (±)	MU R (±)
1	12.5	12.4	0.07	0.13	12.4	12.4	0.06	0.12
2	11.9	11.8	0.2	0.5	11.8	11.8	0.2	0.5
3	11.3	11.3	-	-	11.2	11.3	-	-
4	11.6	11.6	0.6	0.6	11.6	11.6	0.6	0.6
5	11.66	11.61	0.22	0.56	11.61	11.61	0.22	0.56
6	12.0	11.6	0.5	0.7	11.8	11.8	0.5	0.7
7	11.6	11.5	0.3	-	11.5	11.5	0.3	-
8	11.7	11.8	0.11	0.5	11.7	11.8	0.11	0.5
9	11.9	11.9	0.5	0.5	11.9	11.9	0.5	0.5

Wheat Flour – Protein (g/100g) Z-Scores and Methods

Lab Code	Sample PTA 1		Sample PTA 2		Method Code	Calibrating Material
	Average	Z-Score	Average	Z-Score		
1	12.45	3.20 §	12.40	3.72 §	8	Aspartic acid
2	11.85	0.46	11.80	0.29	1	-
3	11.30	-2.06	11.25	-2.86	1	-
4	11.60	-0.69	11.60	-0.86	3	EDTA
5	11.64	-0.53	11.61	-0.80	3	EDTA
6	11.80	0.23	11.80	0.29	1	-
7	11.55	-0.92	11.50	-1.43	3 [†]	EDTA
8	11.75	0.00	11.75	0.00	3	EDTA
9	11.90	0.69	11.90	0.86	3	L. Aspartic Acid

Method Codes

1 = AOAC 2001.11 (Kjeldahl digestion)	3
2 = AOAC 981.10 (Total Kjeldahl Nitrogen)	0
3 = AOAC 992.23, 990.03 (Dumas combustion)	5
4 = AACCI Method 46-15.01 (5-Minute Biuret)	0
5 = AACCI Method 46-19.01 (Calc %Total-N)	0
6 = ICC 105/I	0
7 = ISO 20483:2006 (Kjeldahl method)	0
8 = Other	1

A1.2

Summary Statistics

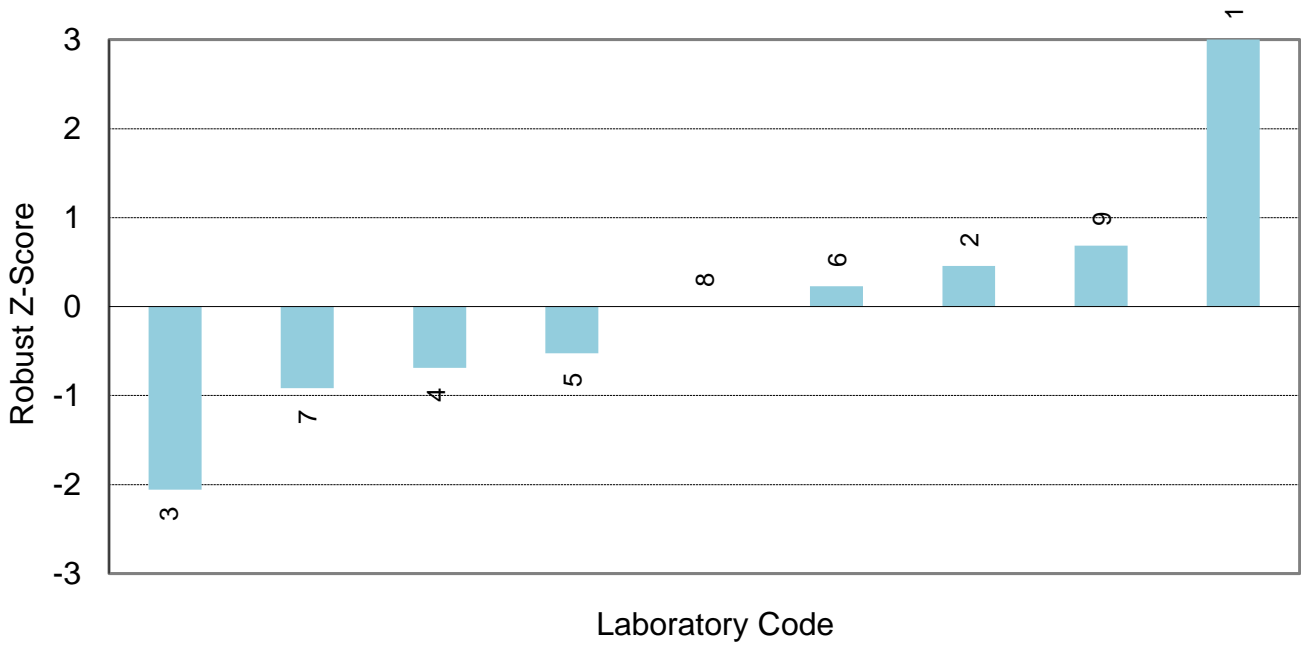
Statistic	Sample PTA 1	Sample PTA 2
Number of Results	9	9
Median	11.75	11.75
Norm IQR	0.22	0.17
Uncertainty (Median)	0.09	0.07
Robust CV	1.9%	1.5%
Minimum	11.30	11.25
Maximum	12.45	12.40
Range	1.15	1.15

Notes:

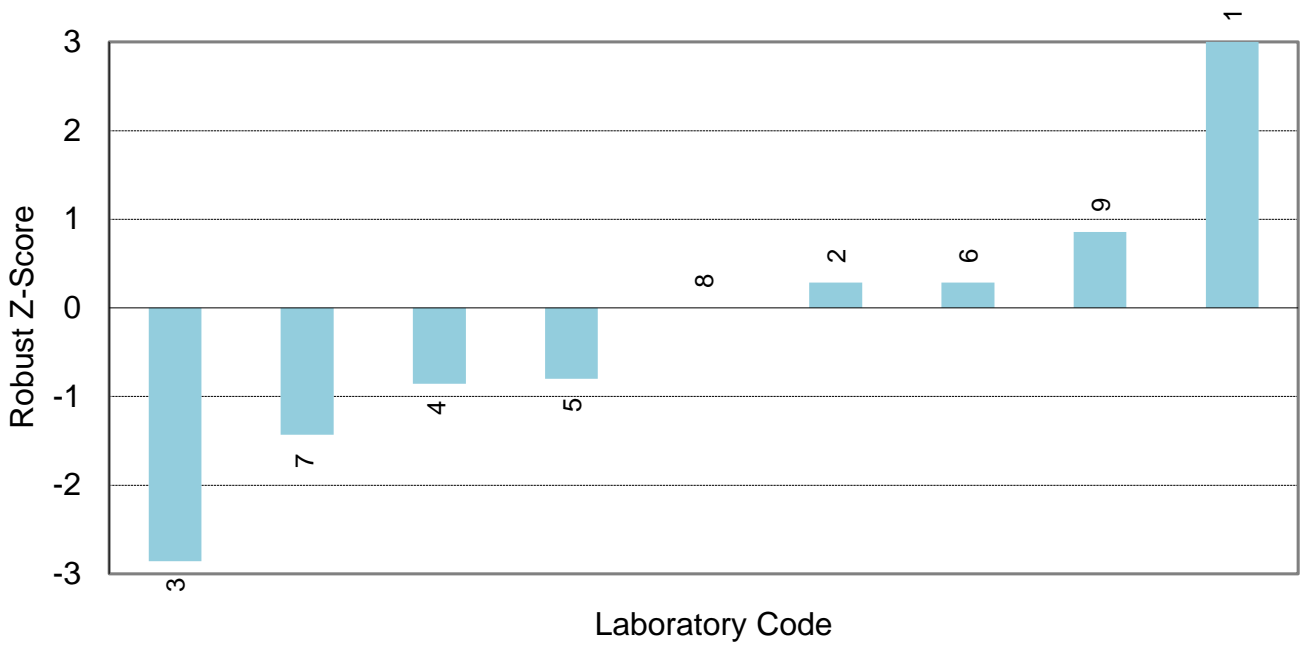
1. § denotes an outlier (i.e. $|z\text{-score}| \geq 3.0$).
2. Laboratory code 1 indicated that they used a method other than those listed in the Method Codes section of the Instructions to Participants, but did not specify the method that they used for testing.
3. † Laboratory code 7 did not provide a method code for their testing but did indicate the method they used for testing. This method was not recognised. This laboratory also indicated that they used EDTA as the Dumas calibrating material, so it was assumed that the method this laboratory used was AOAC 992.23 or AOAC 990.03 (Dumas combustion).

A1.3

Protein (g/100g) - Sample PTA 1



Protein (g/100g) - Sample PTA 2



Section A2

Total Fat

A2.1

Wheat Flour – Total Fat (g/100g) Results and Measurement Uncertainty

Lab Code	Sample PTA 1				Sample PTA 2			
	Result 1	Result 2	MU r (\pm)	MU R (\pm)	Result 1	Result 2	MU r (\pm)	MU R (\pm)
1	1.40	1.70	0.18	0.35	1.53	1.87	0.19	0.38
2	1.42	1.26	0.09	0.13	1.35	1.39	0.09	0.13
3	1.79	1.73	-	-	1.67	1.65	-	-
4	1.99	1.95	0.20	0.20	1.97	2.03	0.20	0.20
6	1.91	1.93	0.4	0.5	1.88	1.94	0.4	0.5
7	1.64	1.55	0.16	-	1.45	1.51	0.15	-
8	1.85	1.79	0.16	0.4	1.76	1.98	0.16	0.4
9	1.60	1.80	0.11	0.12	1.70	1.80	0.11	0.12

Wheat Flour – Total Fat (g/100g) Z-Scores and Methods

Lab Code	Sample PTA 1		Sample PTA 2		Method Code
	Average	Z-Score	Average	Z-Score	
1	1.550	-0.78	1.700	-0.11	1
2	1.340	-1.70	1.370	-1.52	6
3	1.760	0.13	1.660	-0.28	1
4	1.970	1.04	2.000	1.18	1
6	1.920	0.83	1.910	0.79	1
7	1.595	-0.59	1.480	-1.05	7 [†]
8	1.820	0.39	1.870	0.62	1
9	1.700	-0.13	1.750	0.11	1

Method Codes

1 = * Acid-hydrolysis	6
2 = ** Soxhlet extraction	0
3 = AACC 30-25	0
4 = AOAC 996.01	0
5 = AOAC 2003.06	0
6 = ISO 11085:2008 (Randall extraction method)	1
7 = Other	1

A2.2

Summary Statistics

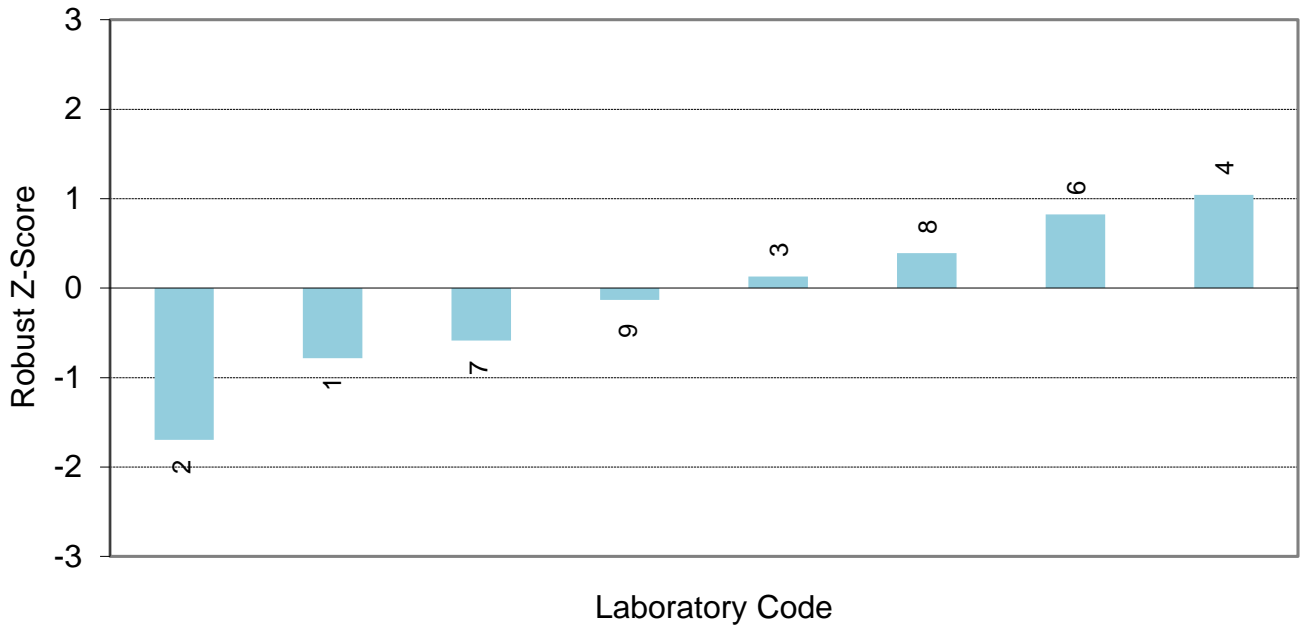
Statistic	Sample PTA 1	Sample PTA 2
Number of Results	8	8
Median	1.730	1.725
Normalised IQR	0.230	0.233
Uncertainty (Median)	0.102	0.103
Robust CV	13.3%	13.5%
Minimum	1.340	1.370
Maximum	1.970	2.000
Range	0.630	0.630

Notes:

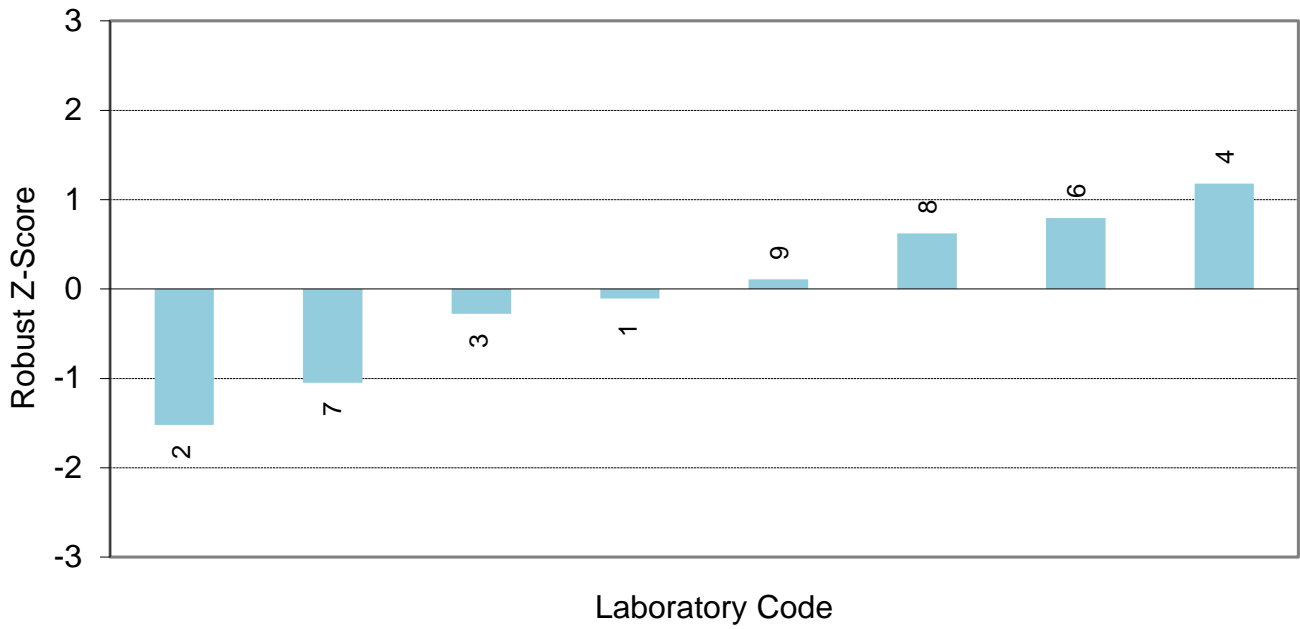
1. * "Acid hydrolysis" includes all methods employing acid hydrolysis of test material prior to ethers extraction.
2. ** "Soxhlet extraction" includes all methods which employ ethers extraction without any prior hydrolysis.
3. † Laboratory code 7 did not provide a method code for their testing but did indicate the method they used for testing. This method was not recognised and was coded as "Other".

A2.3

Total Fat (g/100g) - Sample PTA 1



Total Fat (g/100g) - Sample PTA 2



Section A3

Moisture

A3.1

Wheat Flour – Moisture (g/100g) Results and Measurement Uncertainty

Lab Code	Sample PTA 1				Sample PTA 2			
	Result 1	Result 2	MU r (±)	MU R (±)	Result 1	Result 2	MU r (±)	MU R (±)
1	12.1	12.2	0.08	0.16	12.1	12.2	0.09	0.18
2	12.7	12.6	0.1	0.9	12.7	12.7	0.1	0.9
3	12.4	12.5	-	-	12.4	12.4	-	-
4	11.8	11.7	1.2	1.2	11.7	11.6	1.2	1.2
5	12.78	12.77	0.17	0.65	12.72	12.73	0.17	0.65
6	12.8	12.8	0.1	0.4	12.8	12.7	0.1	0.4
7	11.4	11.6	1.1	-	11.4	11.5	1.1	-
8	12.83	12.83	0.04	0.1	12.82	12.78	0.04	0.1
9	12.4	12.3	1.9	1.9	12.3	12.2	1.9	1.9

Wheat Flour – Moisture (g/100g) Z-Scores and Methods

Lab Code	Sample PTA 1		Sample PTA 2		Method Code	Temp (°C)	Time (hours)
	Average	Z-Score	Average	Z-Score			
1	12.15	-0.55	12.15	-0.50	1	105	16
2	12.65	0.37	12.70	0.60	1	130	1
3	12.45	0.00	12.40	0.00	6	103	4
4	11.75	-1.28	11.65	-1.49	1	103	overnight
5	12.78	0.59	12.73	0.65	6	130	1
6	12.80	0.64	12.75	0.70	1	130	1
7	11.50	-1.74	11.45	-1.89	13 [†]	105	18
8	12.83	0.70	12.80	0.80	6	130	1
9	12.35	-0.18	12.25	-0.30	6	130	1.5

Method Codes

1 = AOAC 925.10	4
2 = AOAC 925.40	0
3 = AOAC 984.25	0
4 = AACCI Method 44-01.01	0
5 = AACCI Method 44-11.01 (Dielectric Meter)	0
6 = AACCI Method 44-15.02 (Air-Oven)	4
7 = AACCI Method 44-40.01 (Mod. Vac-Oven)	0
8 = ISO 712-1985 (reference method)	0
9 = ISO 712-1986 (routine method)	0
10 = ISO 712:1998 (routine reference method)	0
11 = ISO 7700-1:1984 (moisture meter calibration)	0
12 = Moisture Meter	0
13 = Other	1

A3.2

Summary Statistics

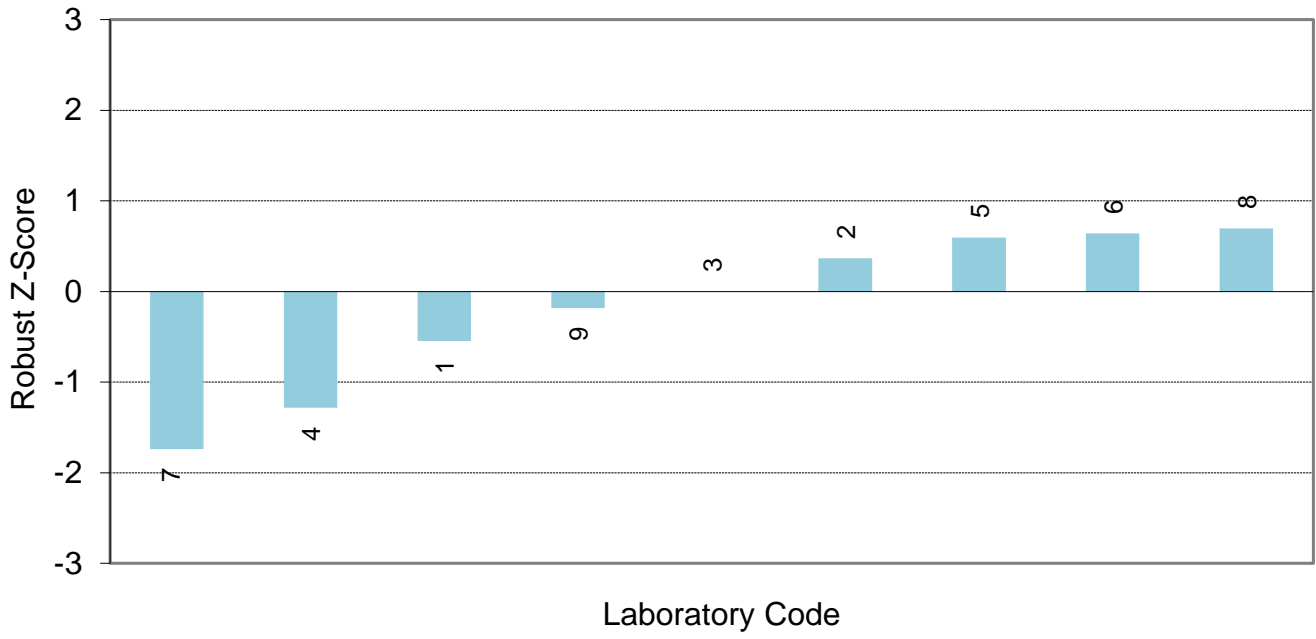
Statistic	Sample PTA 1	Sample PTA 2
Number of Results	9	9
Median	12.45	12.40
Norm IQR	0.55	0.50
Uncertainty (Median)	0.23	0.21
Robust CV	4.4%	4.1%
Minimum	11.50	11.45
Maximum	12.83	12.80
Range	1.33	1.35

Notes:

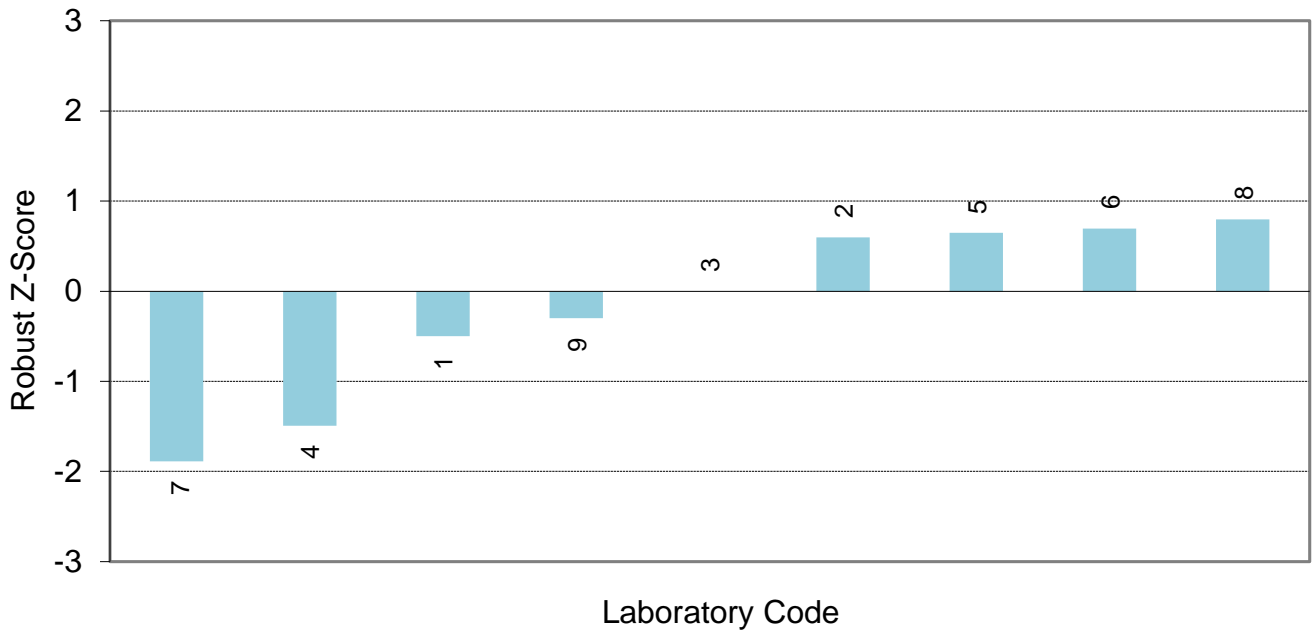
1. † Laboratory code 7 did not provide a method code for their testing but did indicate the method they used for testing. This method was not recognised and was coded as "Other".

A3.3

Moisture (g/100g) - Sample PTA 1



Moisture (g/100g) - Sample PTA 2



Section A4

Ash

A4.1

Wheat Flour – Ash (g/100g) Results and Measurement Uncertainty

Lab Code	Sample PTA 1				Sample PTA 2			
	Result 1	Result 2	MU r (±)	MU R (±)	Result 1	Result 2	MU r (±)	MU R (±)
1	0.75	0.68	0.05	0.10	0.72	0.68	0.03	0.07
2	0.69	0.64	0.03	0.06	0.71	0.63	0.03	0.06
3	0.84	0.77	-	-	0.81	0.77	-	-
4	0.77	0.74	0.08	0.07	0.72	0.72	0.07	0.07
5	0.69	0.69	-	-	0.69	0.68	-	-
6	0.74	0.74	0.06	0.12	0.74	0.74	0.06	0.12
7	0.50	0.52	0.05	-	0.63	0.63	0.06	-
8	0.70	0.71	0.06	0.1	0.70	0.74	0.06	0.1
9	0.68	0.69	0.02	0.02	0.69	0.70	0.02	0.02

Wheat Flour – Ash (g/100g) Z-Scores and Methods

Lab Code	Sample PTA 1		Sample PTA 2		Method Code	Temp (°C)	Time (hours)
	Average	Z-Score	Average	Z-Score			
1	0.715	0.21	0.700	0.00	1	550	16
2	0.665	-0.83	0.670	-0.98	1	550	1
3	0.805	2.08	0.790	2.94	1	550	4
4	0.755	1.04	0.720	0.65	1	550	overnight
5	0.690	-0.31	0.685	-0.49	3	600	8
6	0.740	0.73	0.740	1.31	1	550	6
7	0.510	-4.06 §	0.630	-2.29	11†	600	18
8	0.705	0.00	0.720	0.65	3	580	14
9	0.685	-0.42	0.695	-0.16	1	550	10

Method Codes

1 = AOAC 923.03	6
2 = AOAC other (please specify)	0
3 = AACCI Method 08-01.01	2
4 = AACCI Method 08-02.01 (Rapid Mg Acetate)	0
5 = AACCI Method 08-03.01 (Rapid 2-Hour, 600°)	0
6 = AACCI Method 08-21.01 (NIR)	0
7 = ISO 2171:1993	0
8 = ISO 2171:2007	0
9 = ICC Method No. 104/1 (1990)	0
10 = Pearson	0
11 = Other	1

A4.2

Summary Statistics

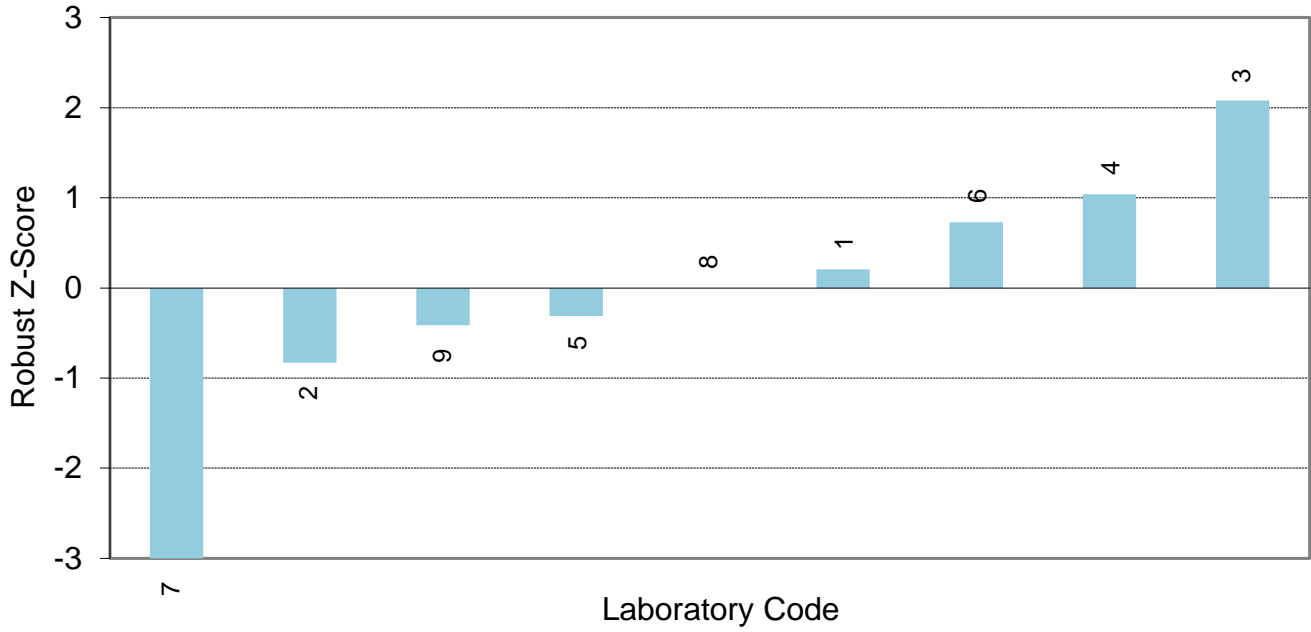
Statistic	Sample PTA 1	Sample PTA 2
Number of Results	9	9
Median	0.705	0.700
Norm IQR	0.048	0.031
Uncertainty (Median)	0.020	0.013
Robust CV	6.8%	4.4%
Minimum	0.510	0.630
Maximum	0.805	0.790
Range	0.295	0.160

Notes:

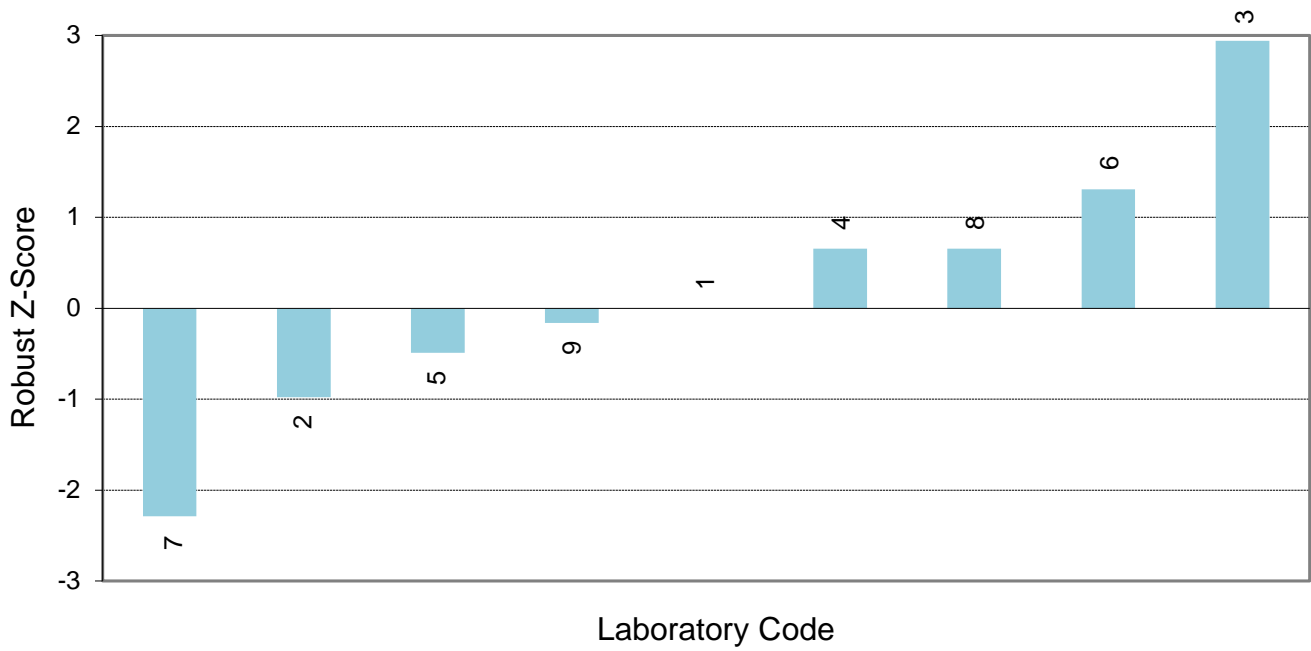
1. § denotes an outlier (i.e. $|z\text{-score}| \geq 3.0$).
2. † Laboratory code 7 did not provide a method code for their testing but did indicate the method they used for testing. This method was not recognised and was coded as "Other".

A4.3

Ash (g/100g) - Sample PTA 1



Ash (g/100g) - Sample PTA 2



Section A5

Dietary Fibre

A5.1

Wheat Flour – Dietary Fibre (g/100g) Results and Measurement Uncertainty

Lab Code	Sample PTA 1				Sample PTA 2			
	Result 1	Result 2	MU r (±)	MU R (±)	Result 1	Result 2	MU r (±)	MU R (±)
1	5.26	-	0.61	1.23	4.48	-	0.57	1.14
2	2.84	2.95	0.18	0.30	2.92	2.98	0.18	0.30
4	3.97	3.85	0.67	0.65	3.90	3.97	0.66	0.67
6	3.32	3.55	0.28	0.34	3.43	3.34	0.27	0.34
8	3.55	3.79	0.8	1.6	3.21	3.58	0.08	1.6
9	4.40	4.80	0.62	0.67	4.90	-	0.69	-

Wheat Flour – Dietary Fibre (g/100g) Z-Scores and Methods

Lab Code	Sample PTA 1		Sample PTA 2		Method Code
	Average	Z-Score	Average	Z-Score	
1	5.260	3.18 §	4.480	1.82	1
2	2.895	-1.94	2.950	-1.60	3
4	3.910	0.26	3.935	0.60	1, 2, 3, 4
6	3.435	-0.77	3.385	-0.63	3
8	3.670	-0.26	3.395	-0.60	1
9	4.600	1.75	4.900	2.76	9

Method Codes

1 = AOAC 985.29 (Prosky)	3
2 = AOAC 991.42	1
3 = AOAC 991.43 (Lee)	3
4 = AOAC 993.19	1
5 = AOAC 994.13 (Theander)	0
6 = AACCI Method 32.05.01	0
7 = AACCI Method 32.07.01	0
8 = AACCI Method 32.21.01 (Enzymatic-Grav.)	0
9 = Other	1

A5.2

Summary Statistics

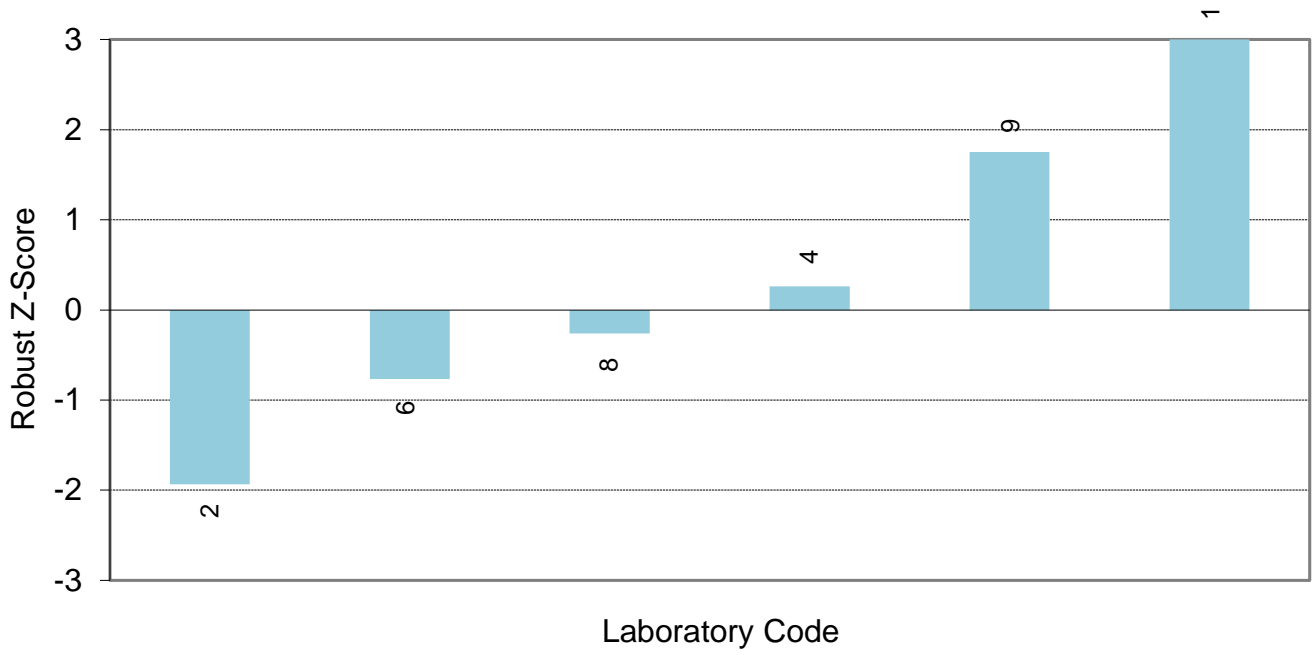
Statistic	Sample PTA 1	Sample PTA 2
No of Results	6	6
Median	3.790	3.665
Norm IQR	0.878	0.899
Uncertainty (Median)	0.449	0.460
Robust CV	23.2%	24.5%
Target SD	0.462	0.447
Target CV	12.2%	12.2%
Minimum	2.895	2.950
Maximum	5.260	4.900
Range	2.365	1.950

Notes:

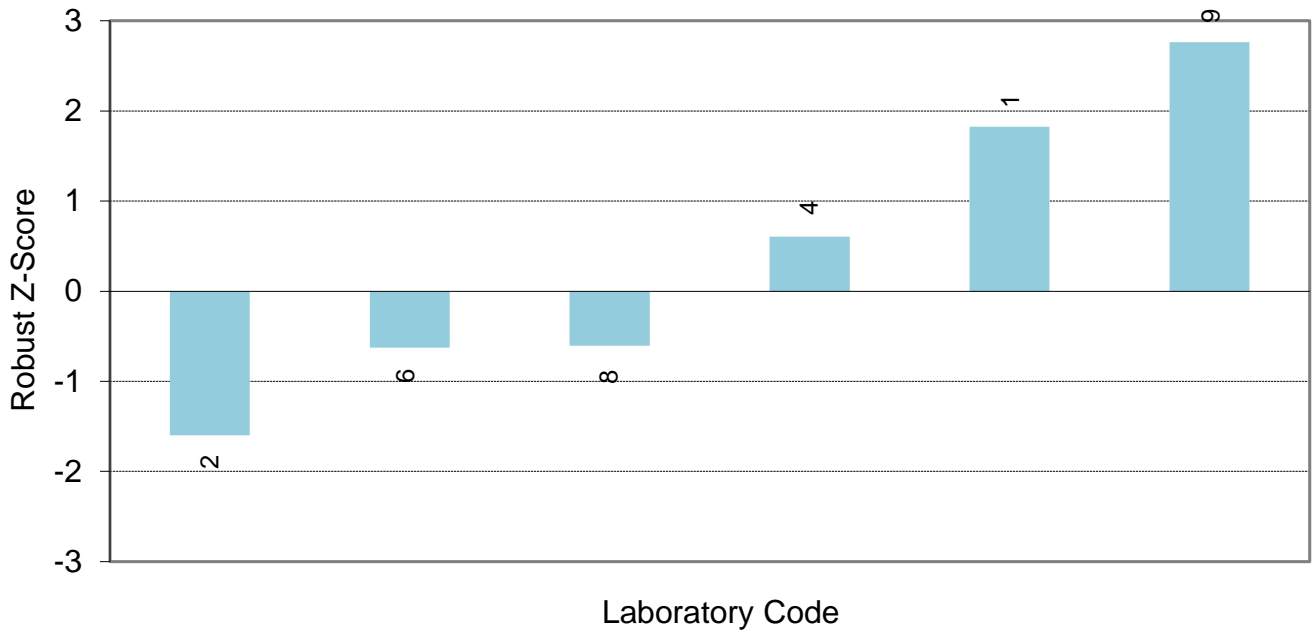
1. § denotes an outlier (i.e. $|z\text{-score}| \geq 3.0$).
2. A target CV was used to calculate the robust z-scores for the Dietary Fibre results for both samples. The target CV chosen was 12.2%.
3. The target SD (standard deviation) was obtained by multiplying the target CV by the median. This target SD was used to calculate the z-scores. For more information on the use of target CVs to calculate z-scores, please see the Guide to Proficiency Testing Australia (2019).

A5.3

Dietary Fibre (g/100g) - Sample PTA 1



Dietary Fibre (g/100g) - Sample PTA 2



Section A6
Carbohydrate

A6.1

**Wheat Flour – Carbohydrate (g/100g)
Results and Measurement Uncertainty**

Lab Code	Sample PTA 1				Sample PTA 2			
	Result 1	Result 2	MU r (±)	MU R (±)	Result 1	Result 2	MU r (±)	MU R (±)
1	68.0	67.6	0.6	1.2	68.3	67.8	0.9	1.8
2	70.5	70.7	-	-	70.6	70.5	-	-
4	69.8	70.1	7.0	7.0	70.1	70.1	7.0	7.0
6	69.3	69.5	0.70	1.0	69.4	69.6	0.7	1.0
7	74.9	74.9	7.5	-	75.0	74.9	7.5	-
8	69.4	69.1	0.8	1.7	69.8	69.1	0.8	1.7
9	69.0	68.5	-	-	68.5	68.6	-	-

**Wheat Flour – Carbohydrate (g/100g)
Z-Scores**

Lab Code	Sample PTA 1		Sample PTA 2	
	Average	Z-Score	Average	Z-Score
1	67.80	-1.39	68.05	-1.21
2	70.60	1.04	70.55	0.88
4	69.95	0.48	70.10	0.50
6	69.40	0.00	69.50	0.00
7	74.90	4.79 §	74.95	4.57 §
8	69.25	-0.13	69.45	-0.04
9	68.75	-0.57	68.55	-0.80

Summary Statistics

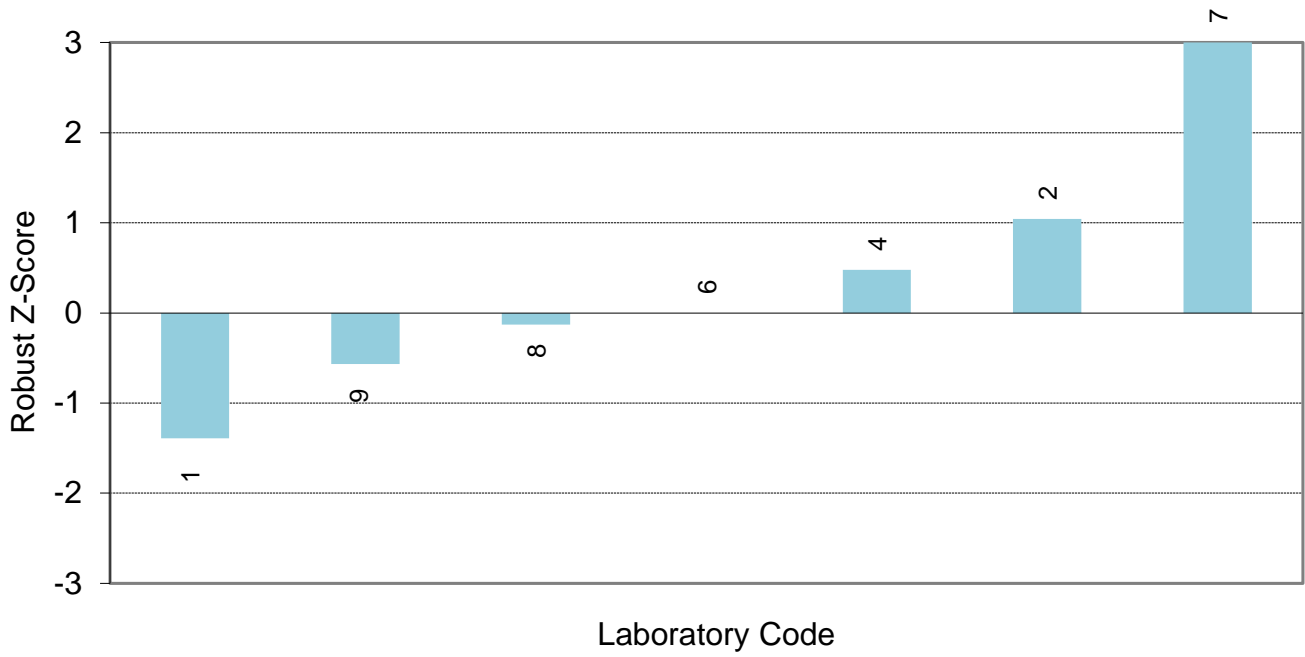
Statistic	Sample PTA 1	Sample PTA 2
Number of Results	7	7
Median	69.40	69.50
Norm IQR	1.15	1.19
Uncertainty (Median)	0.54	0.57
Robust CV	1.7%	1.7%
Minimum	67.80	68.05
Maximum	74.90	74.95
Range	7.10	6.90

Note:

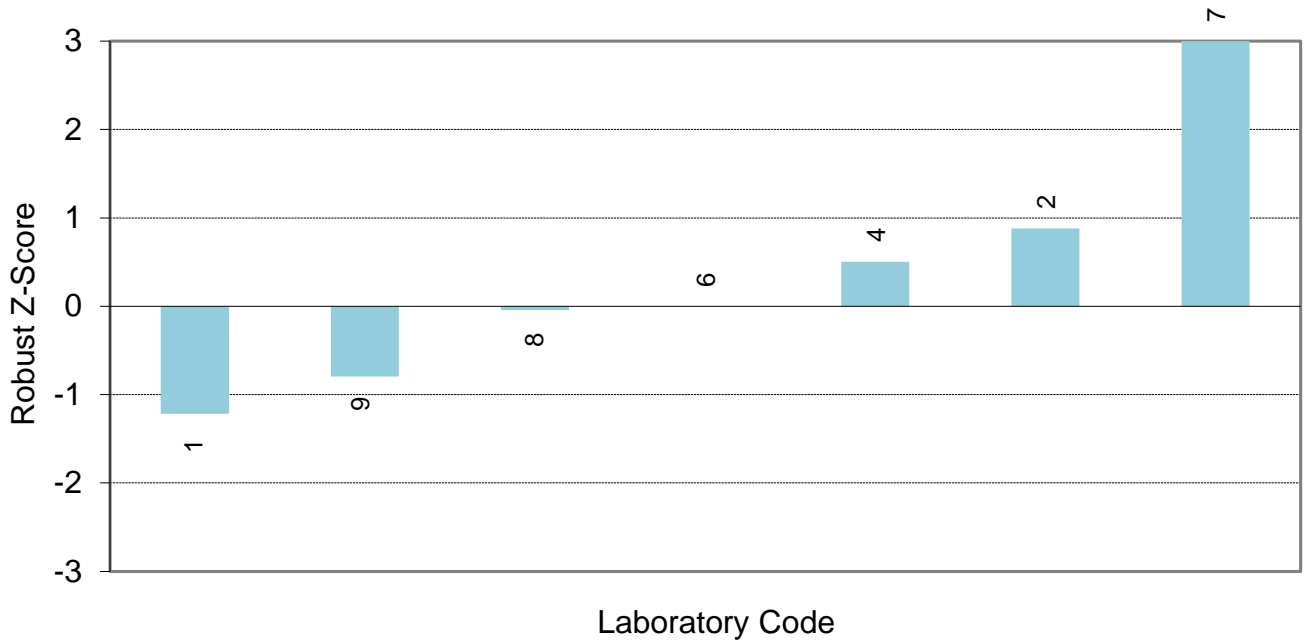
- § denotes an outlier (i.e. |z-score| ≥ 3.0).

A6.2

Carbohydrate (g/100g) - Sample PTA 1



Carbohydrate (g/100g) - Sample PTA 2



Section A7

Energy

A7.1

Wheat Flour – Energy (kJ/100g) Results and Measurement Uncertainty

Lab Code	Sample PTA 1				Sample PTA 2			
	Result 1	Result 2	MU r (\pm)	MU R (\pm)	Result 1	Result 2	MU r (\pm)	MU R (\pm)
1	1463	1475	9	17	1467	1467	11	22
2	1476	1473	-	-	1473	1474	-	-
4	1490	1493	149	149	1493	1495	149	150
6	1478	1476	21	28	1477	1480	21	28
7	1530	1530	150	-	1520	1530	150	-
8	1476	1472	17	36	1476	1477	17	36
9	1471	1472	397	397	1470	1473	397	398

Wheat Flour – Energy (kJ/100g) Z-Scores

Lab Code	Sample PTA 1		Sample PTA 2	
	Average	Z-Score	Average	Z-Score
1	1469.0	-0.53	1467.0	-0.77
2	1474.5	0.00	1473.5	-0.24
4	1491.5	1.64	1494.0	1.41
6	1477.0	0.24	1478.5	0.16
7	1530.0	5.36 §	1525.0	3.92 §
8	1474.0	-0.05	1476.5	0.00
9	1471.5	-0.29	1471.5	-0.40

Summary Statistics

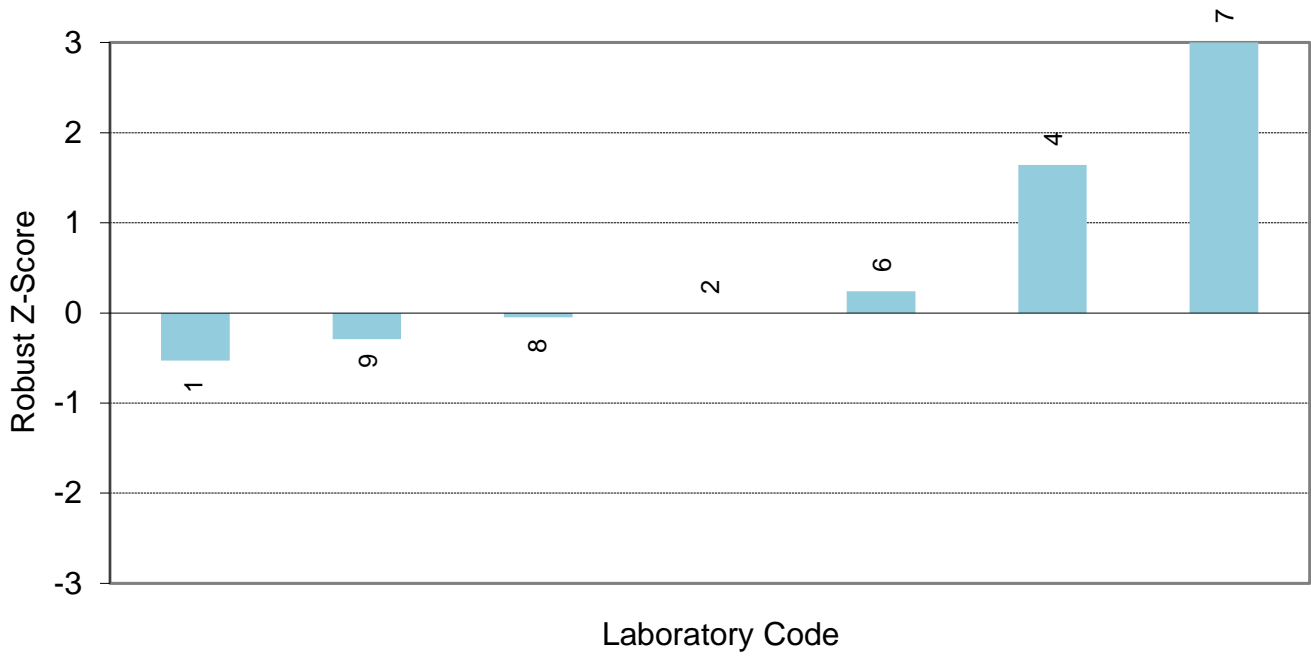
Statistic	Sample PTA 1	Sample PTA 2
Number of Results	7	7
Median	1474.5	1476.5
Norm IQR	10.4	12.4
Uncertainty (Median)	4.9	5.9
Robust CV	0.7%	0.8%
Minimum	1469.0	1467.0
Maximum	1530.0	1525.0
Range	61.0	58.0

Note:

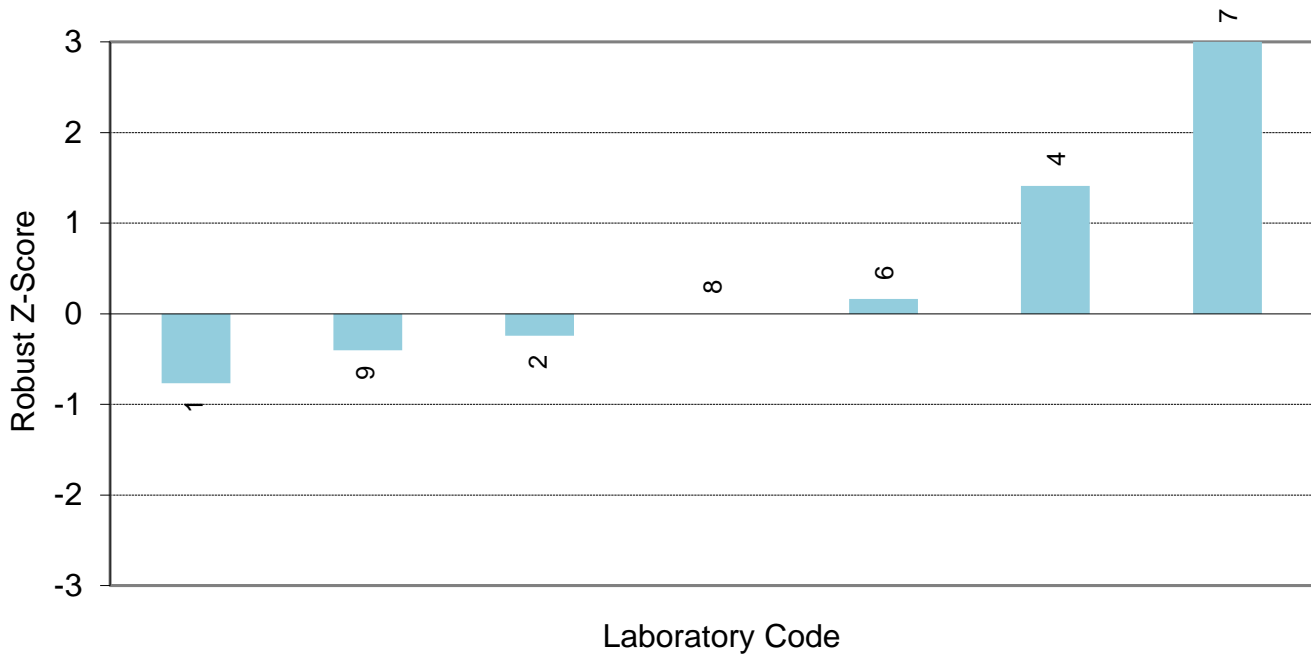
- § denotes an outlier (i.e. $|z\text{-score}| \geq 3.0$).

A7.2

Energy (kJ/100g) - Sample PTA 1



Energy (kJ/100g) - Sample PTA 2



APPENDIX B

Homogeneity Testing and Stability Testing

B1.1

Homogeneity Testing

Prior to distribution, eight samples of wheat flour were selected at random and tested for homogeneity by Global Proficiency Ltd (New Zealand). Each sample was tested in duplicate for Moisture. The results of the homogeneity testing appear in the following tables.

Wheat Flour – Moisture (g/100g)	
Result A	Result B
12.8	12.8
12.7	12.7
12.7	12.8
12.8	12.7
12.7	12.7
12.7	12.8
12.8	12.8
12.7	12.9

Analysis of this data indicated that the samples were sufficiently homogeneous and, therefore, any participant results identified as outliers cannot be attributed to sample variability.

B2.1

Stability Testing

Three samples were selected at random and tested for stability by Global Proficiency Ltd (New Zealand). The results, below, indicated that the samples were sufficiently stable for use in this program.

Wheat Flour – Moisture (g/100g)	
Result A	Result B
12.8	12.7
12.7	12.6
12.7	12.7

APPENDIX C

Instructions to Participants

and

Results Sheet

C1.1

PROFICIENCY TESTING AUSTRALIA
FOOD PROFICIENCY TESTING PROGRAM
ROUND 44, JULY 2020
INSTRUCTIONS TO PARTICIPANTS



To ensure that results obtained in this program can be analysed properly, participants are asked to adhere carefully to the following instructions.

1. Each participant will be supplied with two 100 g samples of wheat flour labelled PTA 1 and PTA 2.
2. Store your samples in the original packaging in a cool, dry place until testing commences.
3. The tests to be performed in this program are:
 - Protein
 - Total Fat
 - Moisture
 - Ash
 - Dietary Fibre
 - Carbohydrate[†]
 - Energy^{††}

Notes: [†] determined by difference.
 ^{††} determined by calculation.

4. The tests may commence as soon as samples are received. Analysts should be aware of analyte stability and perform tests in an appropriate order. The conversion factor to be used for reporting protein is $N \times 5.7$.
5. Tests are to be performed on each sample in duplicate and the results reported on the Results Sheet.
6. Report results on the attached Results Sheet to the specified number of decimal places (d.p.). Results should not be reported as “greater than” or “less than”, as such data cannot be statistically analysed.
7. Please identify the methods used on the Results Sheet, using the Method Codes listed on Page 2 of these instructions. Laboratories should use the routine test methods which would normally be used to test customer supplied samples.
8. Laboratories are also requested to calculate and report an estimate of uncertainty of measurement for each reported measurement result. All estimates of uncertainty of measurement must be given as a 95% confidence interval (coverage factor $k \approx 2$).
9. Return the Results Sheet, either by mail, facsimile or email to:

Mark Bunt Proficiency Testing Australia PO Box 7507 Silverwater NSW 2128 AUSTRALIA	Telephone: +61 2 9736 8397 (1300 782 867) Fax: +61 2 9743 6664 Email: mbunt@pta.asn.au
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All results should arrive at the above address by no later than **Friday 14 August 2020**.
Results reported later than this date may not be analysed in the final report.

PROFICIENCY TESTING AUSTRALIA
FOOD PROFICIENCY TESTING PROGRAM
ROUND 44, JULY 2020

INSTRUCTIONS TO PARTICIPANTS

METHOD CODES

Analysis	Method	Code
Protein (g/100g)	AOAC 2001.11 (Kjeldahl digestion)	1
	AOAC 981.10 (Total Kjeldahl Nitrogen)	2
	AOAC 992.23, 990.03 (Dumas combustion)	3
	AACCI Method 46-15.01 (5-Minute Biuret)	4
	AACCI Method 46-19.01 (Calc %Total-N)	5
	ICC 105/l	6
	ISO 20483:2006 (Kjeldahl method)	7
	Other (please specify)	8
Total Fat (g/100g)	* Acid-hydrolysis	1
	** Soxhlet extraction	2
	AACC 30-25	3
	AOAC 996.01	4
	AOAC 2003.06	5
	ISO 11085:2008 (Randall extraction method)	6
	Other (please specify)	7
Moisture (g/100g)	AOAC 925.10	1
	AOAC 925.40	2
	AOAC 984.25	3
	AACCI Method 44-01.01	4
	AACCI Method 44-11.01 (Dielectric Meter)	5
	AACCI Method 44-15.02 (Air-Oven)	6
	AACCI Method 44-40.01 (Mod. Vac-Oven)	7
	ISO 712-1985 (reference method)	8
	ISO 712-1986 (routine method)	9
	ISO 712:1998 (routine reference method)	10
	ISO 7700-1:1984 (moisture meter calibration)	11
	Moisture Meter	12
	Other (please specify)	13
Ash (g/100g)	AOAC 923.03	1
	AOAC other (please specify)	2
	AACCI Method 08-01.01	3
	AACCI Method 08-02.01 (Rapid Mg Acetate)	4
	AACCI Method 08-03.01 (Rapid 2-Hour, 600°)	5
	AACCI Method 08-21.01 (NIR)	6
	ISO 2171:1993	7
	ISO 2171:2007	8
	ICC Method No. 104/1 (1990)	9
	Pearson	10
	Other (please specify)	11

Continued over page

PROFICIENCY TESTING AUSTRALIA
FOOD PROFICIENCY TESTING PROGRAM
ROUND 44, JULY 2020



INSTRUCTIONS TO PARTICIPANTS

METHOD CODES AND CARBOHYDRATE / ENERGY CALCULATIONS

Analysis	Method	Code
Dietary Fibre (g/100g)	AOAC 985.29 (Prosky)	1
	AOAC 991.42	2
	AOAC 991.43 (Lee)	3
	AOAC 993.19	4
	AOAC 994.13 (Theander)	5
	AACCI Method 32.05.01	6
	AACCI Method 32.07.01	7
	AACCI Method 32.21.01 (Enzymatic-Grav.)	8
	Other (please specify)	9

* “Acid hydrolysis” includes all methods employing acid hydrolysis of test material prior to ethers extraction.

** “Soxhlet extraction” includes all methods which employ ethers extraction without any prior hydrolysis.

Since November 2001, the Australia New Zealand Food Standards Code (FSC 1.2.8, 1) has defined carbohydrate as the difference from 100 of moisture, protein, total fat, ash and dietary fibre (and alcohol and any other unavailable carbohydrates). That is, dietary fibre is included in the difference calculation. So the equation for carbohydrate value calculation for food labelling should be:

$$100 - \text{moisture} - \text{protein} - \text{total fat} - \text{ash} - \text{dietary fibre}.$$

The November 2001 changes to the FSC ascribed an average energy value to dietary fibre of 8 kJ/g. So the equation for energy value calculation for food labelling (FSC 1.2.8, 2(2)) should be:

$$\text{protein} \times 17 + \text{total fat} \times 37 + \text{carbohydrate} \times 17 + \text{dietary fibre} \times 8.$$

PROFICIENCY TESTING AUSTRALIA
FOOD PROFICIENCY TESTING PROGRAM
ROUND 44, JULY 2020

RESULTS SHEET

Laboratory Code:

Date Samples Received: _____ Temperature on Arrival: _____

Test	Sample PTA 1				Sample PTA 2				Date Tested	Method Code
	Result 1	Result 2	MU (\pm) _r	MU (\pm) _R	Result 1	Result 2	MU (\pm) _r	MU (\pm) _R		
Protein (N x 5.7) (g/100g 1 d.p.)										
Total Fat (g/100g 2 d.p.)										
Moisture (g/100g 1 d.p.)										
Ash (g/100g 2 d.p.)										
Dietary Fibre (g/100g 2 d.p.)										
Carbohydrate (g/100g 1 d.p.)										
Energy (kJ/100g)										

Please specify the calibrating material for Dumas nitrogen determination: - _____.
(e.g. pure chemical (EDTA etc.) OR Kjeldahl reference material)

Please specify the temperature/time of moisture determination: _____ °C/ _____ hours.

Please specify the temperature/time of ashing: _____ °C/ _____ hours.

Please state below the method used to determine the measurement uncertainty (e.g. GUM (bottom up), proficiency trial data, in-house precision data, Horwitz equation, "best guess", etc.)

Date: _____ Signature: _____

----- End of report -----