

REPORT NO. 1211

**Non-Pathogens In Food
Proficiency Testing Program
Round 28
August 2020**

ACKNOWLEDGMENTS

PTA wishes to gratefully acknowledge the technical assistance provided for this program by Mrs S Mott, Global Proficiency Ltd (New Zealand). This assistance included providing input into the design of the program, technical advice and discussion of the final report. PTA also wishes to gratefully acknowledge Global Proficiency Ltd (New Zealand) and Global Proficiency Pty Ltd (Australia) for producing and distributing the samples.

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1. FOREWORD

This report summarises the results of a proficiency testing program involving the analysis of milk powder. It constitutes the twenty-eighth of an ongoing series of rounds, involving the microbiological analysis of food samples for a range of non-pathogens. 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 exercise in May / June 2020. The aim of the program was to assess laboratories' ability to competently perform the nominated tests.

The Program Coordinator was Dr M Bunt and the Technical Adviser was Mrs S Mott, Global Proficiency Ltd (New Zealand). This report was authorised by Mrs K Cividin, PTA Quality Manager.

2. FEATURES OF THE PROGRAM

(a) Participating Laboratories

A total of six laboratories participated in the program, all of which returned results for inclusion in the final report.

(b) Documentation and Testing Methods

Laboratories were provided with two 30 g (approx.) samples, one containing a whole milk powder matrix (labelled PTA 1) and one containing a skim milk powder matrix (labelled PTA 2), with two accompanying freeze-dried vials for microbiological analysis. The milk powder samples were provided in sealed foil laminate sachets. Participants were asked to perform tests for:

- Aerobic Plate Count (APC)
- *Escherichia coli* (*E. coli*)
- Coagulase-positive *Staphylococci*
- Total Yeast and Mould Count
- Coliforms
- Enterobacteriaceae
- *Bacillus cereus* (*B. cereus*)

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 Sheets*, which were distributed with the samples. Copies of these documents appear in Appendix C.

(c) Laboratory Identification and Confidentiality

To ensure confidentiality, each laboratory was allocated a random code number. Reference to each laboratory in this report is by its code number. Please note that some laboratories reported more than one set of results and, therefore, these laboratories' code numbers (with letter) could appear several times in the same data set.

(d) Homogeneity Testing

Prior to sample distribution, randomly selected samples were analysed for homogeneity by Global Proficiency Ltd (New Zealand). Based on the results of this testing, the homogeneity of the samples was established (see Appendix B).

(e) Stability Testing

The stability of the samples during transit is no longer an issue, as samples are now shipped using specialised packaging which can keep the samples frozen to destination. The stability trials undertaken for previous rounds of this program also included conditions of mild temperature abuse, which supported the need for good packaging to keep the samples frozen during transit.

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 Aerobic Plate Count, Coliforms, *E. coli*, Enterobacteriaceae, Coagulase-positive *Staphylococci*, *B. cereus* and Total Yeast and Mould Count.

Each section contains, where appropriate:

- i) a table of results reported by laboratories for each test, with estimates of their MUs, calculated z-scores and methods used;
- ii) a listing of the summary statistics; and
- iii) ordered z-score charts.

(b) Appendix B contains details of the homogeneity testing.

(c) Appendix C contains copies of the *Instructions to Participants and Results Sheets*.

4. STATISTICAL DESIGN OF THE PROGRAM

Samples PTA 1 and PTA 2 were obtained from the Global Proficiency DairyChek Microbiology program. Approximate levels (in cfu/g) were as follows:

<u>Test</u>	<u>Sample PTA 1</u>	<u>Sample PTA 2</u>
Aerobic Plate Count	30,000	10,000
Coliforms	200	200
<i>E. coli</i>	200	0
Enterobacteriaceae	200	200
Coagulase-positive <i>Staphylococci</i>	300	400
<i>B. cereus</i>	6,000	2,000
Yeasts	0	400
Moulds	100	100

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*.

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:

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

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

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.* $2.0 < |\text{z-score}| < 3.0$). These results are considered to be questionable results.

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 table below summarises the results submitted for the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.

Table A: Summary Statistics for All Tests

Test	Method	Summary Statistics	PTA 1	PTA 2
Aerobic Plate Count	Pour Plate	Number of Results	29	29
		Median	4.450	4.040
		Normalised IQR	0.148	0.119
		Uncertainty (Median)	0.035	0.028
Coliforms	Pour Plate	Number of Results	17	19
		Median	2.150	2.150
		Normalised IQR	0.208	0.141
		Uncertainty (Median)	0.063	0.040
<i>E. coli</i>	Pour Plate / Petrifilm™ / HGMF	Number of Results	21	24
		Median	2.150	n/a
		Normalised IQR	0.400	n/a
		Uncertainty (Median)	0.109	n/a
Enterobacteriaceae	Pour Plate / Petrifilm™	Number of Results	22	24
		Median	2.165	2.190
		Normalised IQR	0.132	0.137
		Uncertainty (Median)	0.035	0.035
Coagulase-positive <i>Staphylococci</i>	Spread Plate	Number of Results	19	19
		Median	2.510	2.520
		Normalised IQR	0.122	0.145
		Uncertainty (Median)	0.035	0.042
<i>B. cereus</i>	Spread Plate	Number of Results	19	22
		Median	3.790	3.245
		Normalised IQR	0.107	0.145
		Uncertainty (Median)	0.031	0.039
Total Yeast and Mould Count	Pour Plate / Spread Plate	Number of Results	29	32
		Median	1.890	2.620
		Normalised IQR	0.089	0.100
		Uncertainty (Median)	0.021	0.022

Table B: Summary of Statistical Outliers and False Results

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

Test	Method	Outliers		False Results	
		Sample PTA 1	Sample PTA 2	Sample PTA 1	Sample PTA 2
Aerobic Plate Count	Pour Plate / Petrifilm™	6, 7A, 7B	7A	-	-
Coliforms	Pour Plate / Petrifilm™	6, 7A	2A, 2B	-	-
<i>E. coli</i>	Pour Plate / Petrifilm™	1, 6		-	-
Enterobacteriaceae	Pour Plate	7A	7B	-	-
Coagulase-positive <i>Staphylococci</i>	Spread Plate	-	-	-	-
<i>B. cereus</i>	Spread Plate	6	6	-	-
Total Yeast and Mould Count	All Methods Pooled	6, 7A, 7B	6	-	-

Notes for Tables A and B:

1. The results reported are for log₁₀ (cfu/g).
2. All the methods used by the participants were pooled when analysing the results.
3. The summary statistics reported (including the number of results) and z-scores were calculated from the Global Proficiency Ltd DairyChek Microbiology program, using the same samples, for all tests.
4. Target CVs were used to calculate the z-scores for at least one of the samples for Coliforms, *E. coli*, Enterobacteriaceae and Total Yeast and Mould Count.
5. Sample PTA 2 did not contain *E. coli*.
6. Sample PTA 1 did not contain Yeasts.

6. PTA AND TECHNICAL ADVISER'S COMMENTS

Round 28 of the Non-Pathogens in Food Proficiency Testing Program consisted of a two-sample set. Sample PTA 1 contained *E. coli* as the Coliform / Enterobacteriaceae organism present, whereas Sample PTA 2 contained *Klebsiella pneumoniae* as the only Coliform / Enterobacteriaceae organism present in the sample.

Both sample PTA 1 and PTA 2 contained a species of *Penicillium* to contribute to the Mould count, and sample PTA 2 contained a species of *Candida* to contribute to the Yeast count.

Both samples PTA 1 and PTA 2 contained *Bacillus cereus* and *Staphylococcus aureus* species. Other bacterial species were included to contribute to the Aerobic Plate Count, but not interfere with the tests for the indicator organisms.

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, outliers and false results identified for each of the tests / methods analysed are reported in Tables A and B on the previous pages. Complete details of the statistical analyses and the methods used by laboratories for testing appear in Appendix A.

6.1 Return Rate

All of the six laboratories that participated in the program submitted results for inclusion in the final report. Of these six laboratories, three (50%) submitted more than one result for each sample, for at least one of the tests, using either the same or different methods. One of these six laboratories (17%) submitted results for all seven tests. The return rate for all tests is as follows:

• Aerobic Plate Count	6 out of 6	100%
• Coliforms	5 out of 6	83%
• <i>E. coli</i>	3 out of 6	50%
• Enterobacteriaceae	4 out of 6	67%
• Coagulase-positive <i>Staphylococci</i>	3 out of 6	50%
• <i>B. cereus</i>	3 out of 6	50%
• Total Yeast and Mould Count	6 out of 6	100%

6.2 Performance Summary

One or more statistical outliers or false results were reported by four of the six laboratories (67%) that submitted results for this round of the Non-Pathogens in Food program. For comparison, 83% of the participants in Round 27 of the Non-Pathogens in Food program reported outliers or false results (see Report No. 1177 for more details).

A total of 80 results were analysed in this round of the program. Of these results, 18 (23%) were identified as outliers or false results. For comparison, 12% of the results analysed in Round 27 of the Non-Pathogens in Food program were outliers or false results (see Report No. 1177 for more details).

6.3 Aerobic Plate Count

All of the six laboratories that undertook testing for Aerobic Plate Count tested using Pour Plate, including two laboratories that submitted two sets of results. One laboratory tested using Petrifilm™. The results for the Pour Plate and Petrifilm™ methods were pooled and analysed against the Pour Plate results from the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.

The robust CVs for the results for this round were 3.3% and 2.9%, for samples PTA 1 and PTA 2, respectively. These values compare well with the robust CV of 3.8%, obtained in Round 27 of the Non-Pathogens in Food program for sample PTA 1 for Aerobic Plate Count (see Report No. 1177 for more details).

Laboratory code 7A (using Pour Plate) reported outliers for both samples. Laboratory codes 6 and 7B (using Pour Plate) reported outliers for sample PTA 1. All outlying results were lower than expected, indicating under-recovery of the organisms present in the 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 and / or method within a test. For the Aerobic Plate Count test, the median and associated standard error (se) for each sample (expressed in \log_{10} cfu/g) was as follows:

	PTA 1	PTA 2
APC - Pour Plate	4.450 ± 0.035	4.040 ± 0.028

Two laboratories reported MUs associated with their test results in this round for Aerobic Plate Count, as \log_{10} cfu/g values.

Graphs showing the distribution of results in this round for the Aerobic Plate Count test (including the Global Proficiency data) are included in Figures TA-1 and TA-2 for interest purposes only.

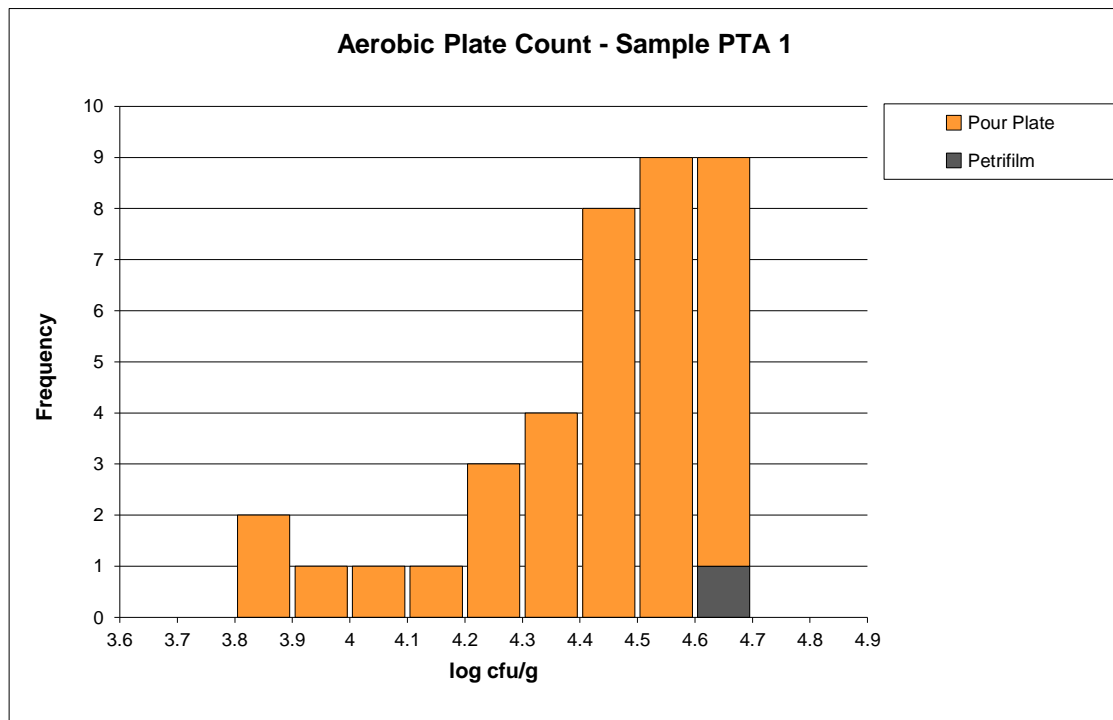


Figure TA-1. Aerobic Plate Count \log_{10} cfu/g results for sample PTA 1.

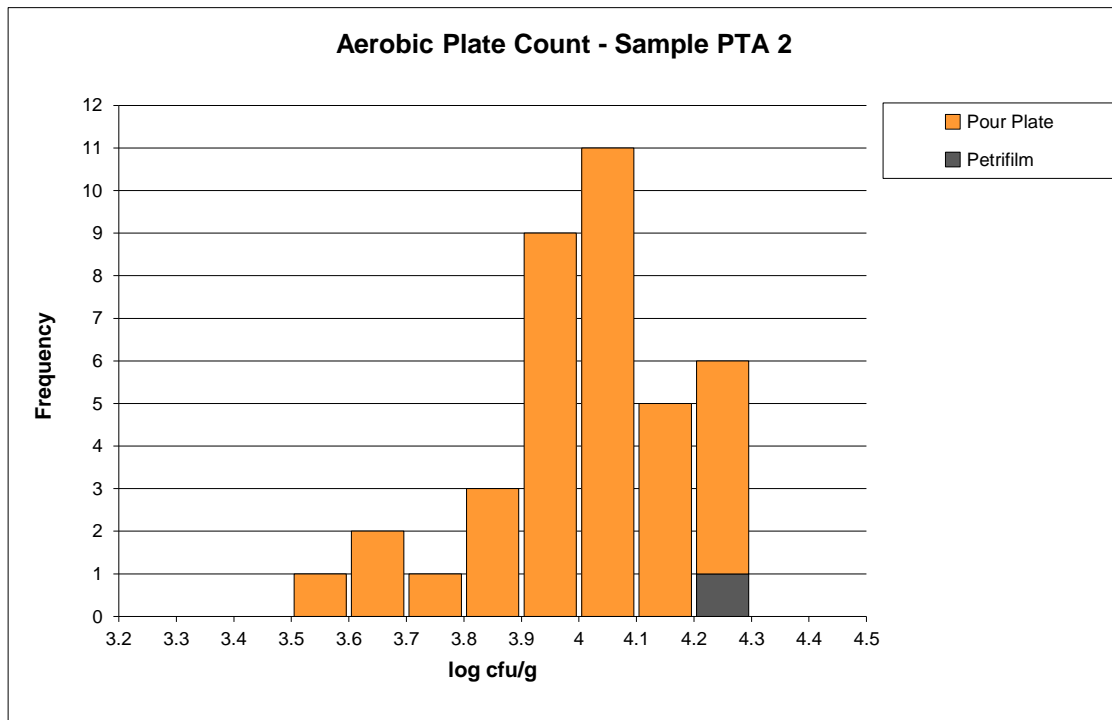


Figure TA-2. Aerobic Plate Count log₁₀ cfu/g results for sample PTA 2.

6.4 Coliforms

A total of five laboratories submitted results for Coliforms. Three laboratories tested using Pour Plate, including two laboratories that submitted two sets of results. Two laboratories tested using Petrifilm™. The Pour Plate and Petrifilm™ results were pooled and analysed against the Pour Plate results from the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.

The robust CVs for the results for this round were 9.7% and 6.6%, for samples PTA 1 and PTA 2, respectively. Neither of these robust CVs were considered appropriate to evaluate the performance of the participants in this round, so target CVs were used to calculate the z-scores for both samples. The target CVs chosen were 7.1% and 5.3% for samples PTA 1 and PTA 2, respectively. These values were chosen because they are more consistent with the robust CVs obtained in previous rounds of this program for Coliforms using samples with similar levels.

Laboratory code 6 (using Petrifilm™) and laboratory code 7A (using Pour Plate) reported outliers for sample PTA 1. Laboratory codes 2A and 2B (using Pour Plate) reported outliers for sample PTA 2. Three of the four outlying results were higher than expected, and one was lower.

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 and / or method within a test. For the Coliforms test, the median and associated standard error (se) for each sample (expressed in \log_{10} cfu/g) was as follows:

	PTA 1	PTA 2
Coliforms - Pour Plate	2.150 ± 0.063	2.150 ± 0.040

None of the laboratories reported MUs associated with their test results in this round for Coliforms.

Graphs showing the distribution of results in this round for the Coliforms test (including the Global Proficiency data) are included in Figures TA-3 and TA-4 for interest purposes only.

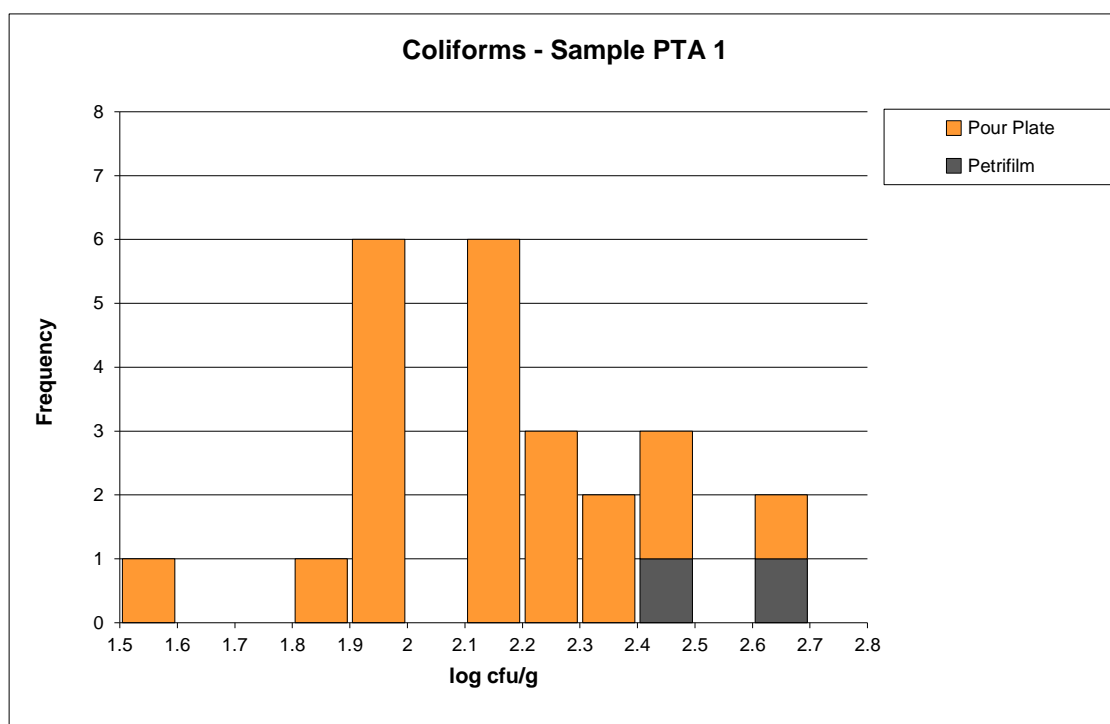


Figure TA-3. Coliforms \log_{10} cfu/g results for sample PTA 1.

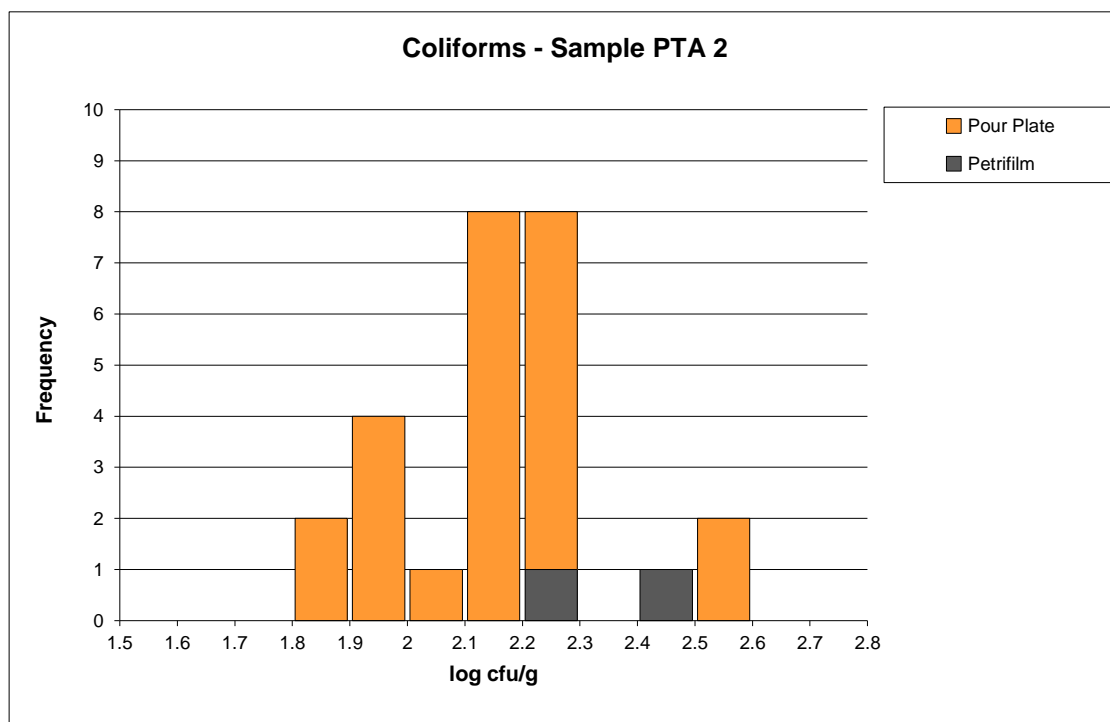


Figure TA-4. Coliforms log₁₀ cfu/g results for sample PTA 2.

6.5 *E. coli*

Three laboratories submitted results for *E. coli*. Of these three laboratories, one submitted results using the Pour Plate method, while two tested using Petrifilm™. The results for the Pour Plate and Petrifilm™ methods were pooled and analysed against the pooled Pour Plate, Petrifilm™ and HGMF results from the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.

The robust CV for sample PTA 1 this round was 18.6%. This value was considered inappropriate to evaluate the performance of the participants in this round, so a target CV was used to calculate the z-scores for sample PTA 1. The target CV chosen was 5.0%. This value was chosen because it is more consistent with the robust CVs obtained in previous rounds of this program for *E. coli*, at similar levels.

Laboratory code 1 (using Pour Plate) and laboratory code 6 (using Petrifilm™) reported outliers for sample PTA 1, which were higher than expected. Sample PTA 2 did not contain *E. coli* but did contain a species of Thermotolerant *Klebsiella pneumoniae*.

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 and / or method within a test. For the *E. coli* test, the median and associated standard error (se) for each sample (expressed in log₁₀ cfu/g) was as follows:

	PTA 1	PTA 2
<i>E. coli</i> - Pour Plate	2.150 ± 0.080	-
<i>E. coli</i> - Pour Plate / Petrifilm™ / HGMF	2.150 ± 0.109	-

None of the laboratories reported MUs associated with their test results in this round for *E. coli*.

A graph showing the distribution of results in this round for the *E. coli* test (including the Global Proficiency data) is included in Figure TA-5 for interest purposes only.

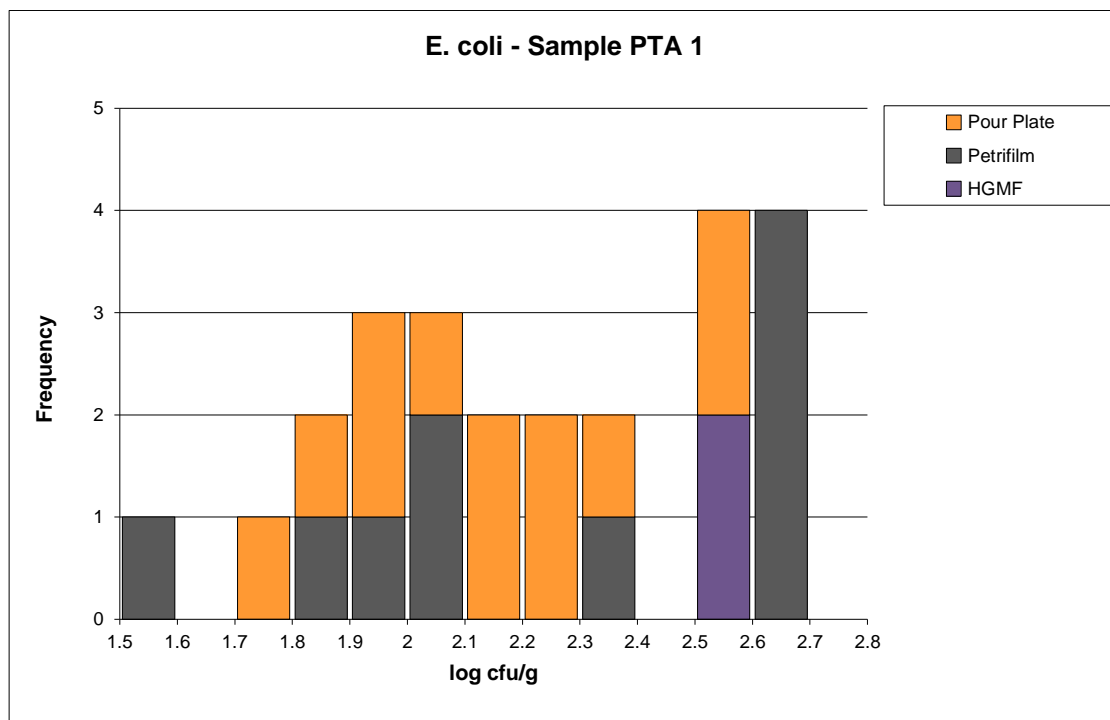


Figure TA-5. *E. coli* log₁₀ cfu/g results for sample PTA 1.

6.6 Enterobacteriaceae

All four of the laboratories that submitted results for Enterobacteriaceae tested using Pour Plate, with two of these laboratories submitting two sets of results. The Pour Plate results were analysed against the pooled Pour Plate and Petrifilm™ results from the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.

The robust CVs for the results for this round were 6.1% and 6.3%, for samples PTA 1 and PTA 2, respectively. Neither of these robust CVs were considered appropriate to evaluate the performance of the participants in this round, so target CVs were used to calculate the z-scores for both samples. The target CVs chosen were 7.5% for both samples. These values were chosen because they are more consistent with the robust CVs obtained in previous rounds of this program for Enterobacteriaceae, at similar levels.

Laboratory code 7A (using Pour Plate) reported an outlier for sample PTA 1. Laboratory code 7B (using Pour Plate) reported an outlier for sample PTA 2. Both outlying results were lower than expected.

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 and / or method within a test. For the Enterobacteriaceae test, the median and associated standard error (se) for each sample (expressed in log₁₀ cfu/g) was as follows:

	PTA 1	PTA 2
Enterobacteriaceae - Pour Plate	2.080 ± 0.041	2.145 ± 0.034
Enterobacteriaceae - Pour Plate / Petrifilm™	2.165 ± 0.035	2.190 ± 0.035

One laboratory reported MUs associated with their test results in this round for Enterobacteriaceae, as log₁₀ cfu/g values.

Graphs showing the distribution of results in this round for the Enterobacteriaceae test (including the Global Proficiency data) are included in Figures TA-6 and TA-7 for interest purposes only.

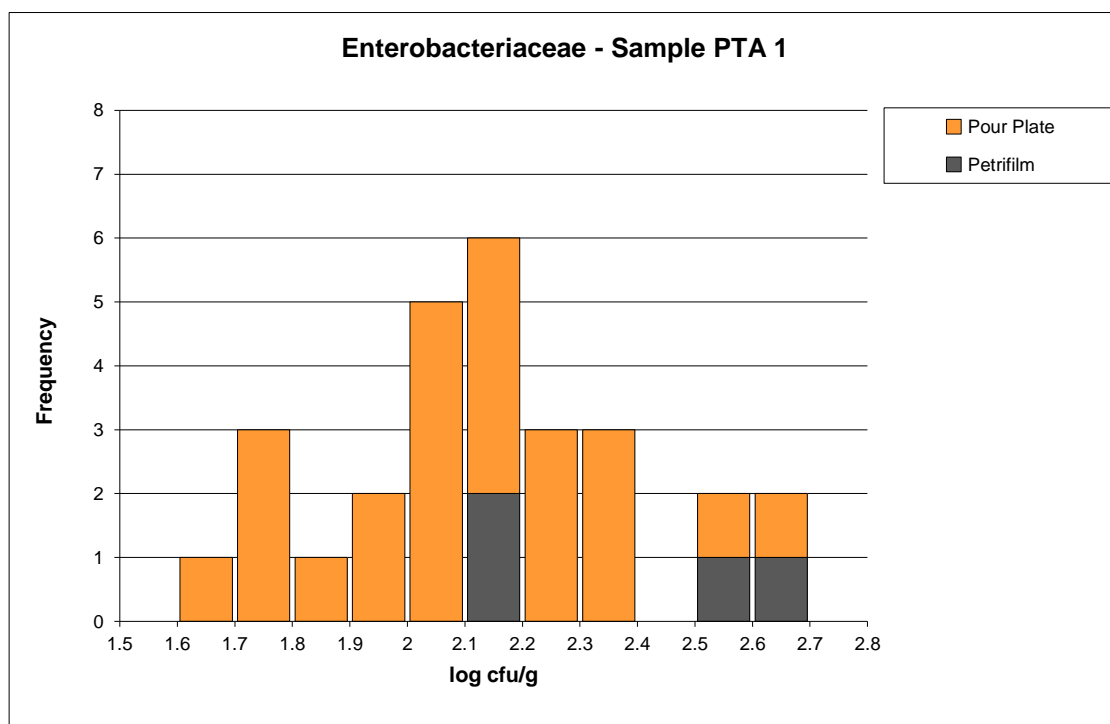


Figure TA-6. Enterobacteriaceae log₁₀ cfu/g results for sample PTA 1.

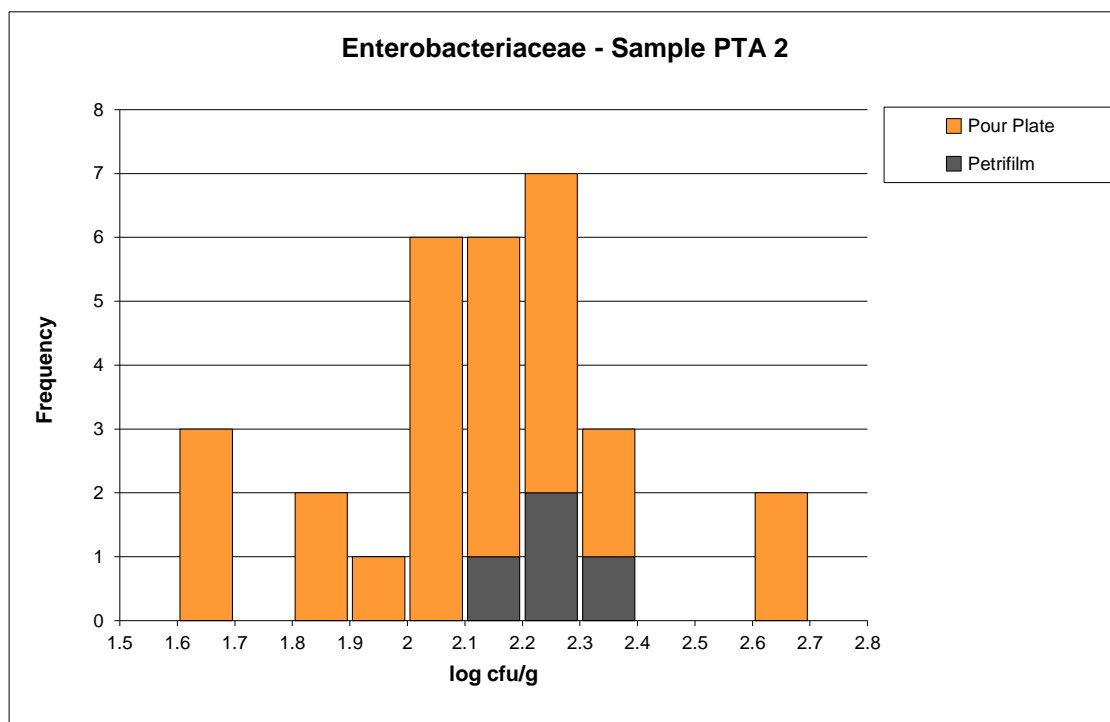


Figure TA-7. Enterobacteriaceae log₁₀ cfu/g results for sample PTA 2.

6.7 Coagulase-positive *Staphylococci*

All three laboratories that submitted results for Coagulase-positive *Staphylococci* tested using Spread Plate. These Spread Plate results were analysed against the Spread Plate results from the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.

The robust CVs for the results for this round were 4.9% and 5.7%, for samples PTA 1 and PTA 2, respectively. These values compare well with the robust CV of 4.8% obtained in Round 27 of the Non-Pathogens in Food program for sample PTA 1 for Coagulase-positive *Staphylococci* (see Report No. 1177 for more details).

There were no outliers reported for Coagulase-positive *Staphylococci* 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 and / or method within a test. For the Coagulase-positive *Staphylococci* test, the median and associated standard error (se) for each sample (expressed in log₁₀ cfu/g) was as follows:

	PTA 1	PTA 2
Coagulase-positive <i>Staphylococci</i> - Spread Plate	2.510 ± 0.035	2.520 ± 0.042

One laboratory reported MUs associated with their test results in this round for Coagulase-positive *Staphylococci*, as log₁₀ cfu/g values.

Graphs showing the distribution of results in this round for the Coagulase-positive *Staphylococci* test (including the Global Proficiency data) are included in Figures TA-8 and TA-9 for interest purposes only.

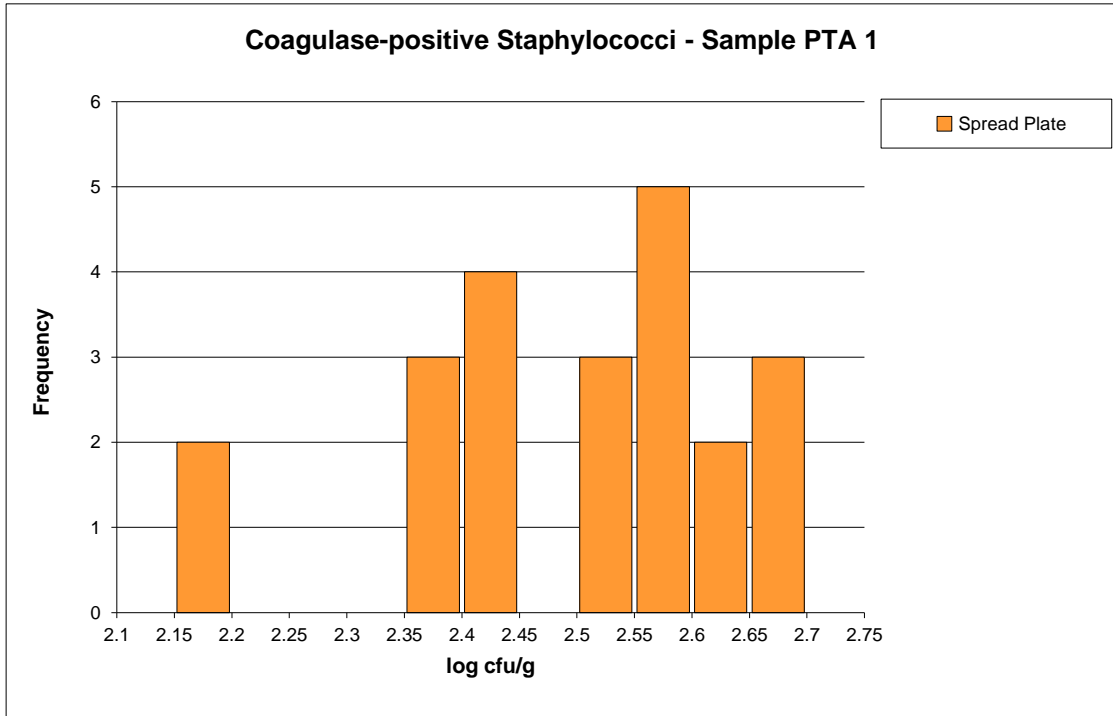


Figure TA-8. Coagulase-positive *Staphylococci* log₁₀ cfu/g results for sample PTA 1.

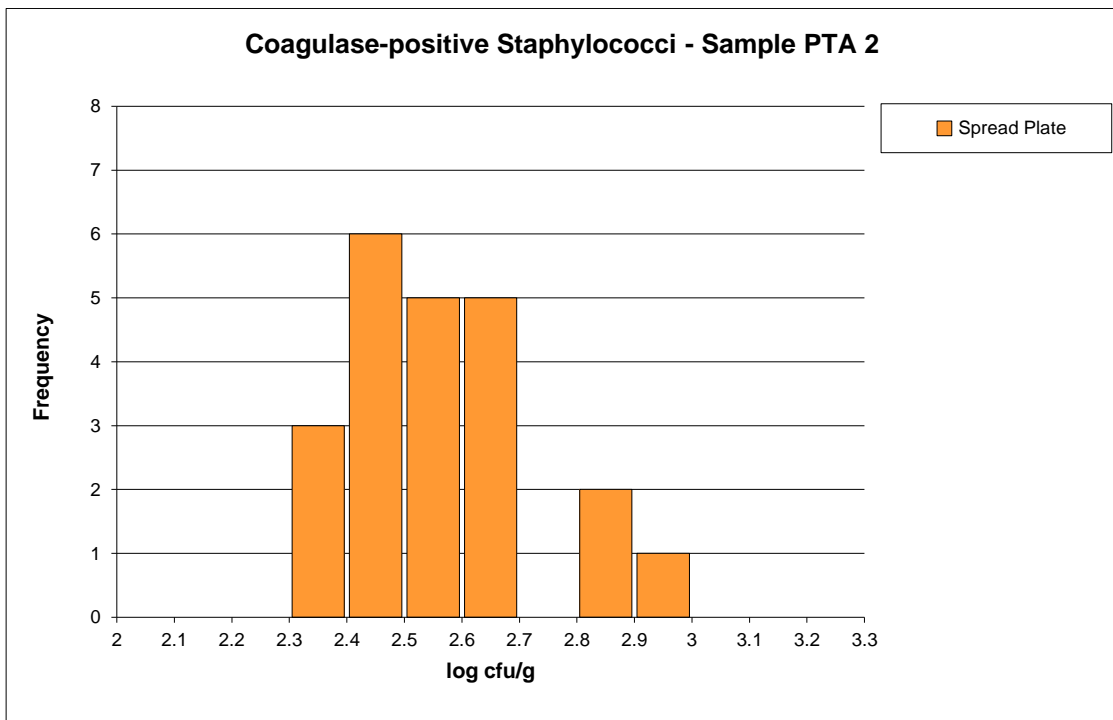


Figure TA-9. Coagulase-positive *Staphylococci* log₁₀ cfu/g results for sample PTA 2.

6.8 *B. cereus*

All three laboratories that submitted results for *B. cereus* tested using Spread Plate. These Spread Plate results were analysed against the Spread Plate results from the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.

The robust CVs for the results for this round were 2.8% and 4.5%, for samples PTA 1 and PTA 2, respectively. These values compare well with the robust CVs of 4.0% and 5.4%, obtained in Round 27 of the Non-Pathogens in Food program for *B. cereus* (see Report No. 1177 for more details).

Laboratory code 6 (using the Spread Plate method) reported outliers for both samples, with results lower than expected.

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 and / or method within a test. For the *B. cereus* test, the median and associated standard error (se) for each sample (expressed in log₁₀ cfu/g) was as follows:

	PTA 1	PTA 2
<i>B. cereus</i> - Spread Plate	3.790 ± 0.031	3.245 ± 0.039

One laboratory reported MUs associated with their test results in this round for *B. cereus*, as log₁₀ cfu/g values. The laboratory may need to re-examine their test results or their MU calculations as their results for PTA 1 and the stated uncertainty were outside the expected range of the median and its associated uncertainty.

Graphs showing the distribution of results in this round for the *B. cereus* test (including the Global Proficiency data) are included in Figures TA-10 and TA-11 for interest purposes only.

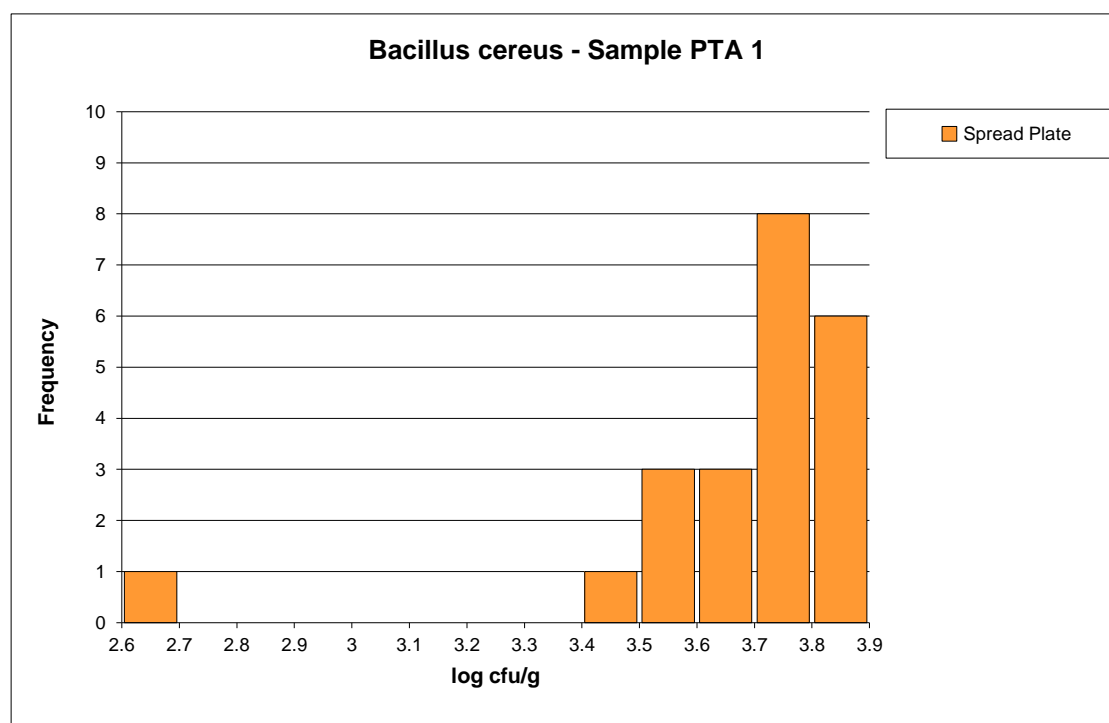


Figure TA-10. *Bacillus cereus* log₁₀ cfu/g results for sample PTA 1.

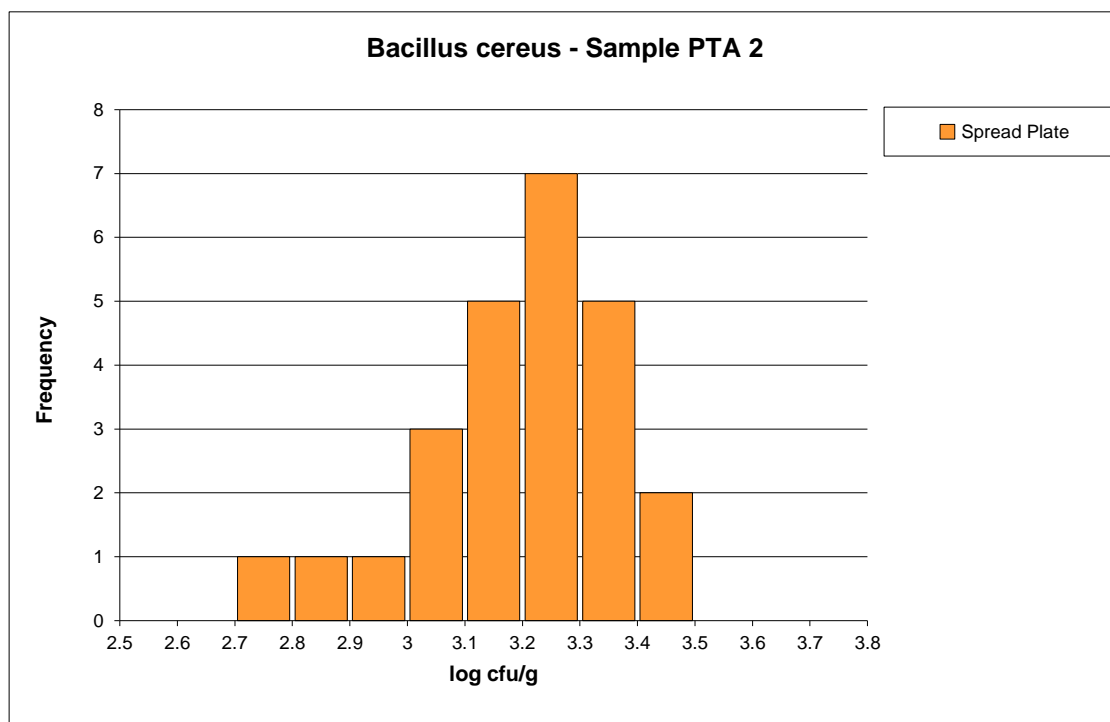


Figure TA-11. *Bacillus cereus* log₁₀ cfu/g results for sample PTA 2.

6.9 Total Yeast and Mould Count

A total of six laboratories submitted results for Total Yeast and Mould Count. Five laboratories tested using Spread Plate, including one laboratory that submitted two sets of results. One laboratory tested using Pour Plate and submitted two sets of results. One laboratory tested using Petrifilm™. All the methods were pooled and analysed against the Pour Plate and Spread Plate results from the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.

The robust CVs for the results for this round were 4.7% and 3.8%, for samples PTA 1 and PTA 2, respectively. Neither of these robust CVs were considered appropriate to evaluate the performance of the participants in this round, so target CVs were used to calculate the z-scores for both samples. The target CVs chosen were 7.5% and 4.4% for samples PTA 1 and PTA 2, respectively. These values were chosen because they are more consistent with the robust CVs obtained in previous rounds of this program for Total Yeast and Mould Count, at similar levels.

Laboratory code 6 (using Spread Plate) reported outliers for both samples that were higher than expected. Laboratory codes 7A and 7B (using Spread Plate) reported outliers for sample PTA 1 that were lower than expected.

Although participants were only asked to report their Total Yeast and Mould Count for this round of the program, laboratory codes 2A and 2B reported their Yeasts Count and Moulds Count in addition to their Total Yeast and Mould Count. Laboratory codes 6, 7A and 7B only reported their Yeasts Count and their Moulds Count for each sample. These results had to be added to obtain the Total Yeast and Mould Count for these laboratories. In addition, laboratory code 6 reported a Yeasts Count for sample PTA 1, but no Moulds Count. Sample PTA 1 contained Moulds but did not contain Yeasts.

Although differentiation between levels of Yeasts and Moulds present in a food sample is undertaken for certain product types, often specifications or standards look to determine the total fungal loading as the “Total Yeast and Mould Count”. As the majority of laboratories in this program have submitted a Total Count, there was insufficient data to provide analysis of the separate fungi types, i.e. differentiation between the Yeasts and Moulds present in the 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 and / or method within a test. For the Total Yeast and Mould Count, the median and associated standard error (se) for each sample (expressed in \log_{10} cfu/g) was as follows:

	PTA 1	PTA 2
Total Yeast and Mould - Pour Plate	1.890 ± 0.020	2.625 ± 0.027
Total Yeast and Mould - Pour Plate / Spread Plate	1.890 ± 0.021	2.620 ± 0.022

One laboratory reported MUs associated with their test results in this round for Total Yeast and Mould Count, as \log_{10} cfu/g values. The laboratory may need to re-examine their test results or their MU calculations as their results for sample PTA 1 and the stated uncertainty were outside the expected range of the median and its associated uncertainty.

Graphs showing the distribution of results in this round for the Total Yeast and Mould Count (including the Global Proficiency data) are included in Figures TA-12 and TA-13 for interest purposes only.

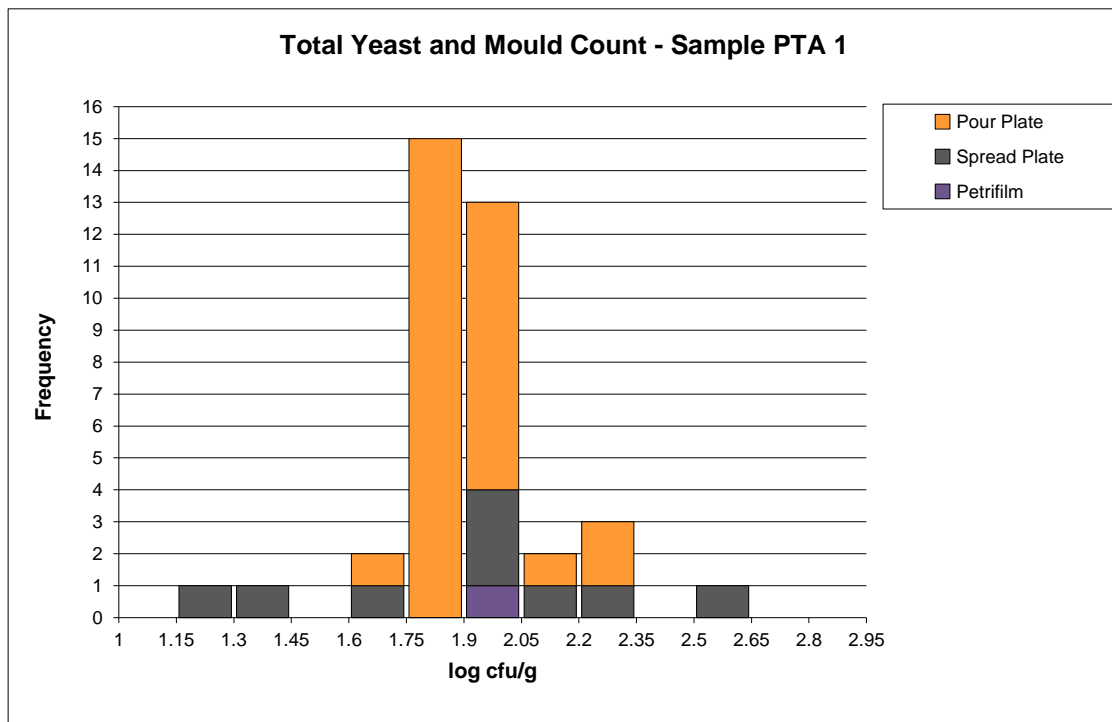


Figure TA-12. Total Yeast and Mould Count log₁₀ cfu/g results for sample PTA 1.

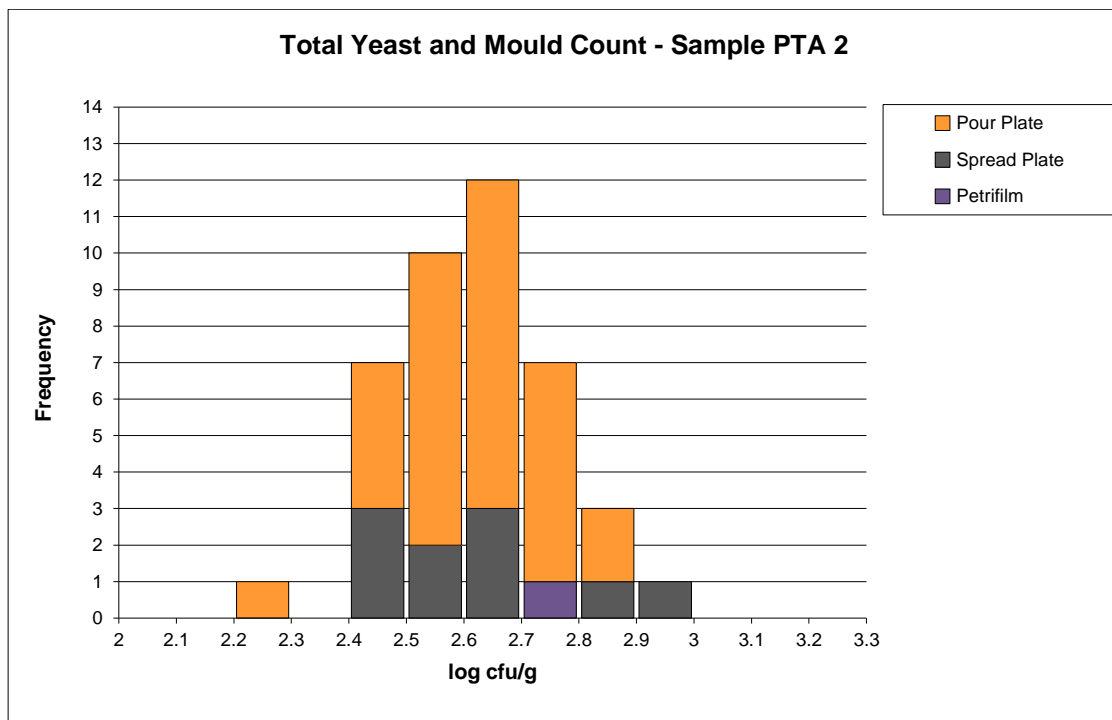


Figure TA-13. Total Yeast and Mould Count log₁₀ cfu/g results for sample PTA 2.

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. AS 5013.2 (2007) *Food microbiology – Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of Bacillus cereus – Colony-count technique at 30°C (ISO 7932: 2004, MOD)*.
4. AS 5013.4 (2009) *Food microbiology – Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of coliforms – Colony-count technique*.
5. AS 5013.5 (2016) *Food microbiology – Microbiology of the food chain – Horizontal method for the enumeration of microorganisms – Colony count at 30°C by the pour plate technique*.
6. AS 5013.9 (2009) *Food microbiology – Examination for specific organisms – Coliforms and Escherichia coli by the triplicate tube detection method*.
7. AS 5013.12.1 (2004) *Food microbiology – Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) – Technique using Baird-Parker agar medium*.
8. AS 5013.15 (2006) *Food microbiology – Microbiology of food and animal feeding stuffs – Horizontal method for the detection and enumeration of presumptive Escherichia coli – Most probable number technique*.
9. AS 5013.29 (2009) *Food microbiology – Examination for specific organisms – Colony count of yeasts and moulds*.
10. ISO 6611 (2004) / IDF 94 (2004) *Milk and milk products – Enumeration of colony-forming units of yeasts and/or moulds – Colony-count technique at 25 degrees C*.
11. ISO 6888-1:1999/Amd.2:2018 *Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) – Part 1: Technique using Baird-Parker agar medium*.
12. ISO 7932 (2004) *Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of presumptive Bacillus cereus – Colony-count technique at 30 degrees C*.
13. ISO 16649-2 (2001) *Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of beta-glucuronidase-positive Escherichia coli – Part 2: Colony-count technique at 44 degrees C using 5-bromo-4-chloro-3-indolyl beta-D-glucuronide*.
14. ISO 21528-2 (2017) *Microbiology of the food chain – Horizontal method for the detection and enumeration of Enterobacteriaceae – Part 2: Colony-count technique*.

APPENDIX A

Summary of Results

Section A1

Aerobic Plate Count

A1.1

Milk Powder – Aerobic Plate Count, Pour Plate / Petrifilm™ (cfu/g)

Lab Code	PTA 1			PTA 2			Z-Scores		Method	Medium
	Result	Log ₁₀	MU	Result	Log ₁₀	MU	PTA 1	PTA 2		
1	41000	4.61	0.1	9800	3.99	0.1	1.10	-0.41	PP	PCA
2A	35000	4.54	-	18000	4.26	-	0.63	1.81	PP	PCA
2B	36000	4.56	-	17000	4.23	-	0.72	1.61	PP	PCA
3	41000	4.61	0.20	7500	3.88	0.20	1.10	-1.39	PP	PCA
6	6350	3.80	-	5400	3.73	-	-4.37 §	-2.59	PP	PCA
7A	7000	3.85	-	3500	3.54	-	-4.08 §	-4.18 §	PP	PCA
7B	8100	3.91	-	4900	3.69	-	-3.65 §	-2.95	PP	PCA
8	43000	4.63	-	11000	4.04	-	1.24	0.01	PP	PCA
8	43000	4.63	-	17000	4.23	-	1.24	1.61	Pfm	-

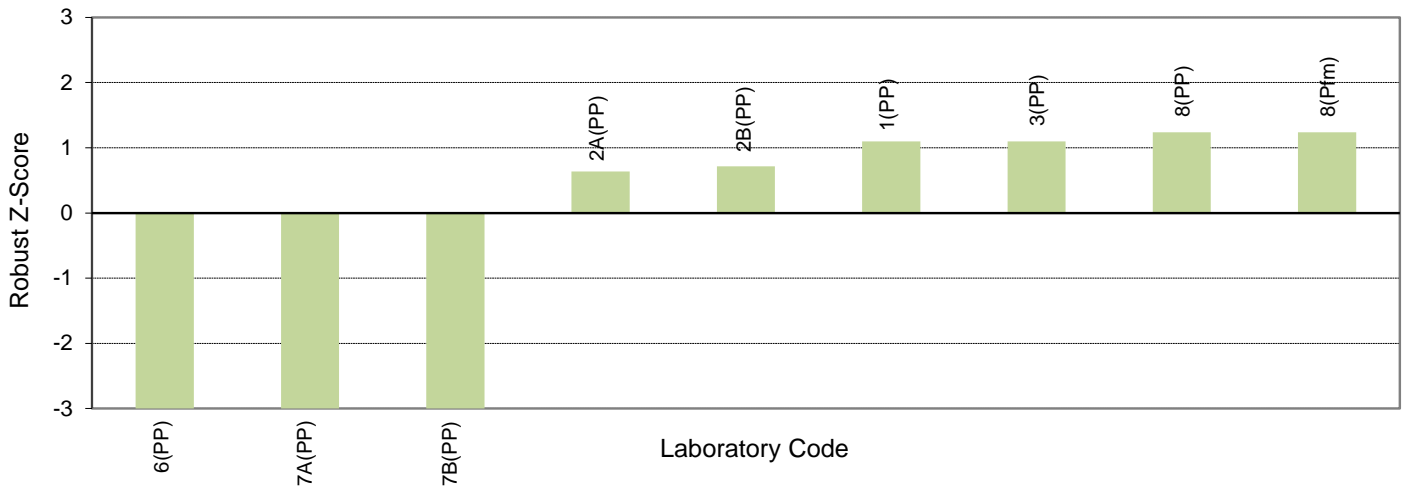
Statistic	Log ₁₀ PTA 1	Log ₁₀ PTA 2
Number of Results	29	29
Median	4.450	4.040
Normalised IQR	0.148	0.119
Uncertainty (Median)	0.035	0.028
Robust CV	3.3%	2.9%
Minimum	4.04	3.65
Maximum	4.70	4.30
Range	0.66	0.65

Notes:

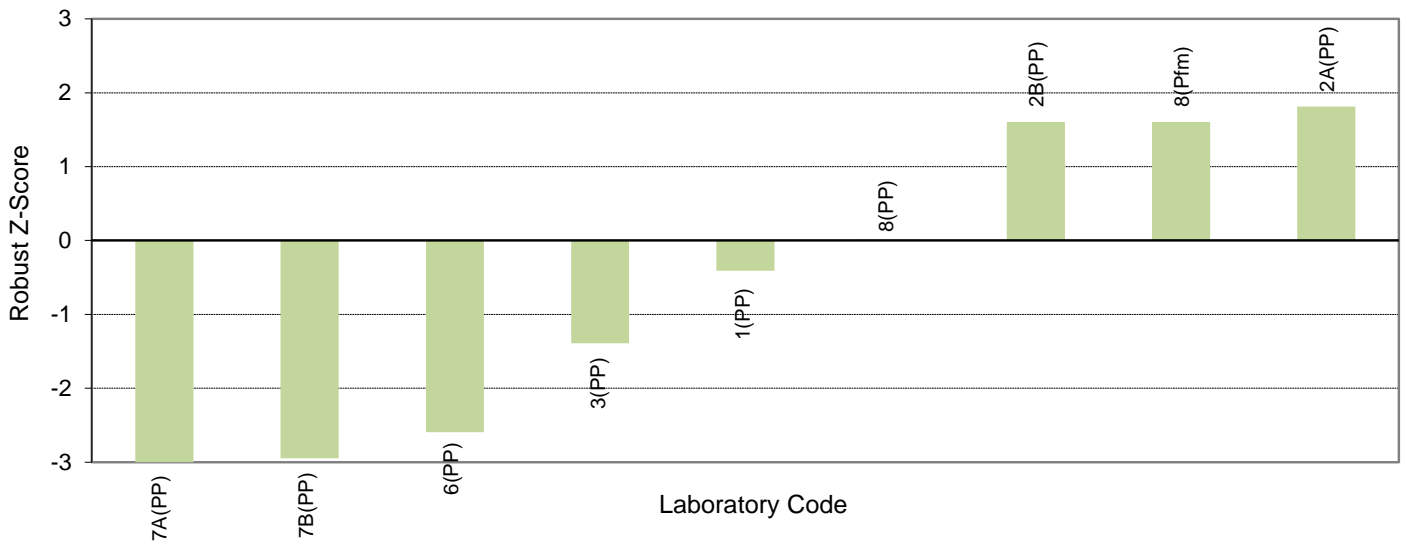
1. § denotes an outlier (i.e. |z-score| ≥ 3.0).
2. For the method abbreviations in the table above, PP = Pour Plate and Pfm = Petrifilm™.
3. The Pour Plate and Petrifilm™ methods were pooled when analysing the Aerobic Plate Count results.
4. Z-scores and summary statistics (including the number of results) for Aerobic Plate Count were calculated from the results for the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.
5. The method used has been appended to the laboratory code on the ordered z-score charts on the following page.

A1.2

Milk Powder - Aerobic Plate Count, Pour Plate / Petrifilm™ [$\log_{10}(\text{cfu/g})$] - PTA 1



Milk Powder - Aerobic Plate Count, Pour Plate / Petrifilm™ [$\log_{10}(\text{cfu/g})$] - PTA 2



Section A2

Coliforms

A2.1

Milk Powder – Coliforms, Pour Plate / Petrifilm™ (cfu/g)

Lab Code	PTA 1			PTA 2			Z-Scores		Method	Medium
	Result	Log ₁₀	MU	Result	Log ₁₀	MU	PTA 1	PTA 2		
1	400	2.60	-	170	2.23	-	2.96	0.71	PP	VRBLA (ISO)
2A	150	2.18	-	320	2.51	-	0.17	3.12 §	PP	VRBA
2B	150	2.18	-	320	2.51	-	0.17	3.12 §	PP	VRBA
6	490	2.69	-	195	2.29	-	3.54 §	1.23	Pfm	-
7A	35	1.54	-	70	1.85	-	-3.97 §	-2.68	PP	VRBA
7B	90	1.95	-	140	2.15	-	-1.28	-0.03	PP	VRBA
8	290	2.46	-	260	2.41	-	2.05	2.33	Pfm	-

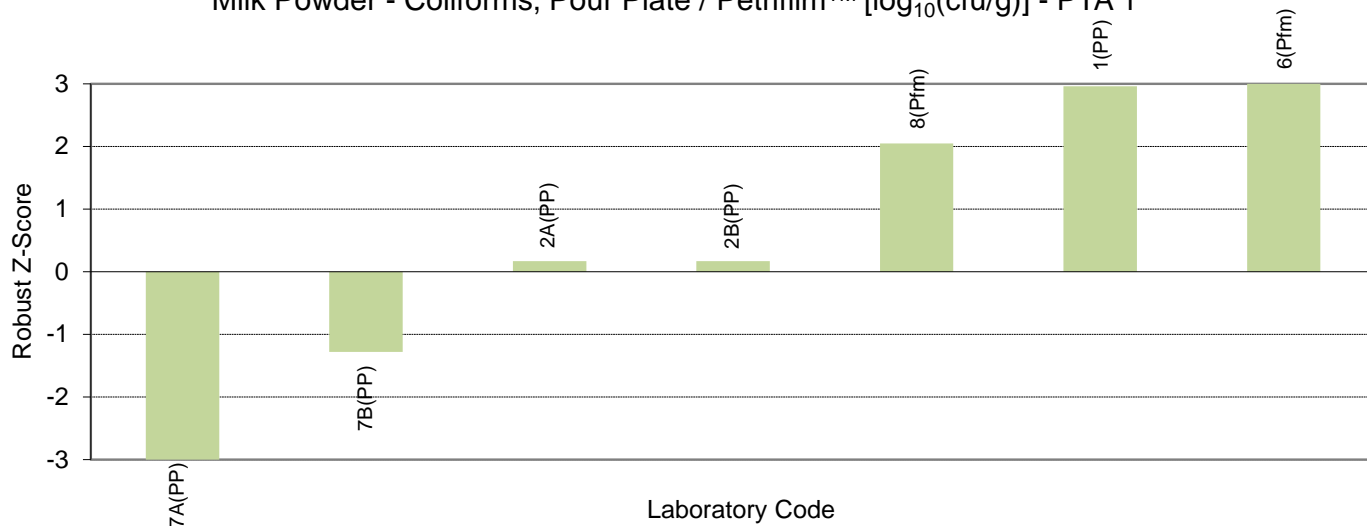
Statistic	Log ₁₀ PTA 1	Log ₁₀ PTA 2
Number of Results	17	19
Median	2.150	2.150
Normalised IQR	0.208	0.141
Uncertainty (Median)	0.063	0.040
Robust CV	9.7%	6.6%
Target SD	0.153	0.114
Target CV	7.1%	5.3%
Minimum	1.83	1.88
Maximum	2.48	2.28
Range	0.65	0.40

Notes:

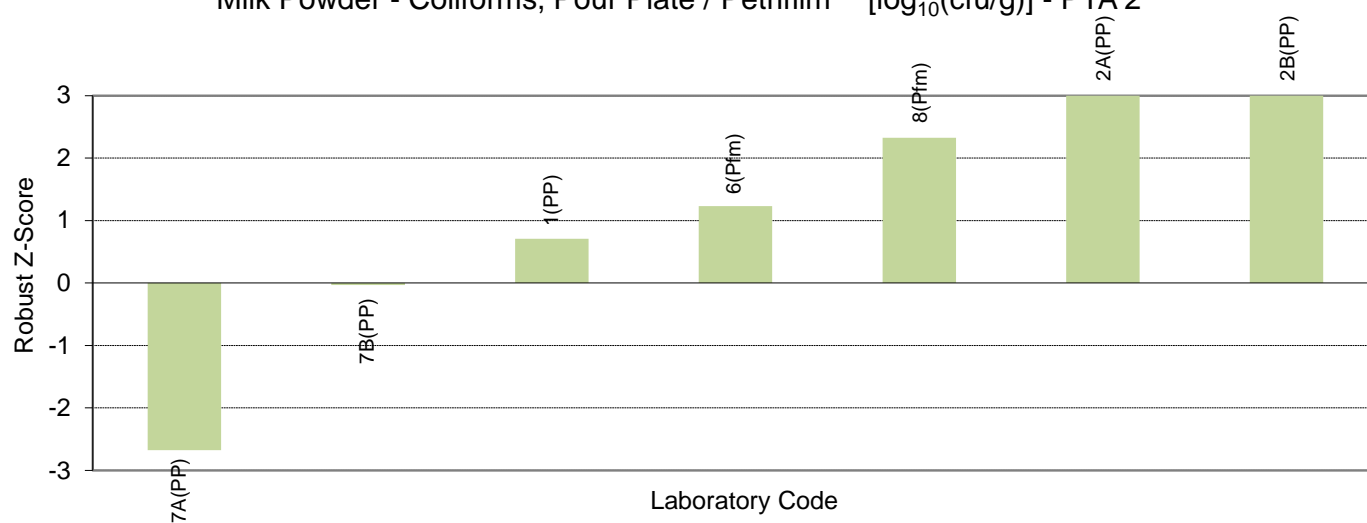
- § denotes an outlier (i.e. |z-score| ≥ 3.0).
- For the method abbreviations in the table above, PP = Pour Plate and Pfm = Petrifilm™.
- The Pour Plate and Petrifilm™ methods were pooled when analysing the Coliforms results.
- Target CVs were used to calculate the robust z-scores for both samples. The target CVs chosen were 7.1% and 5.3% for samples PTA 1 and PTA 2, respectively.
- The target SDs were obtained for each sample by multiplying the target CV by the median. These values were used to calculate the z-scores for each sample. For more information on the use of target CVs to calculate z-scores, please see the Guide to Proficiency Testing Australia (2019).
- Z-scores and summary statistics (including the number of results) for Coliforms were calculated from the results for the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.
- The method used has been appended to the laboratory code on the ordered z-score charts on the following page.

A2.2

Milk Powder - Coliforms, Pour Plate / Petrifilm™ [$\log_{10}(\text{cfu/g})$] - PTA 1



Milk Powder - Coliforms, Pour Plate / Petrifilm™ [$\log_{10}(\text{cfu/g})$] - PTA 2



Section A3

E. coli

A3.1

Milk Powder – *E. coli*, Pour Plate / Petrifilm™ (cfu/g)

Lab Code	PTA 1			PTA 2			Z-Scores		Method	Medium
	Result	Log ₁₀	MU	Result	Log ₁₀	MU	PTA 1	PTA 2		
1	390	2.59	-	< 10	-	-	4.10 §	-	PP	TBX
6	490	2.69	-	0	-	-	5.03 §	-	Pfm	-
8	200	2.30	-	0	-	-	1.40	-	Pfm	-

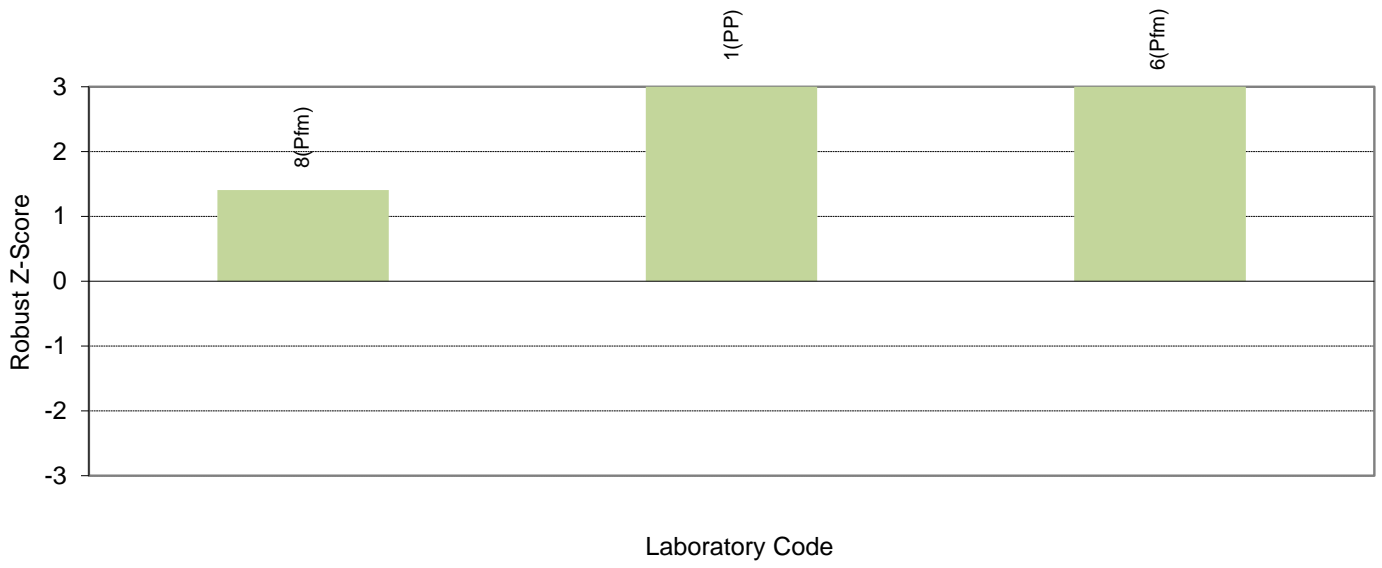
Statistic	Log ₁₀ PTA 1	Log ₁₀ PTA 2
Number of Results	21	24
Median	2.150	n/a
Normalised IQR	0.400	n/a
Uncertainty (Median)	0.109	n/a
Robust CV	18.6%	n/a
Target SD	0.108	n/a
Target CV	5.0%	n/a
Minimum	1.60	n/a
Maximum	2.70	n/a
Range	1.10	n/a

Notes:

- § denotes an outlier (i.e. |z-score| ≥ 3.0).
- For the method abbreviations in the table above, PP = Pour Plate and Pfm = Petrifilm™.
- The Pour Plate and Petrifilm™ methods were pooled when analysing the *E. coli* results.
- A target CV was used to calculate the robust z-scores for sample PTA 1. The target CV chosen was 5.0%.
- The target SD was obtained for sample PTA 1 by multiplying the target CV by the median. This value was used to calculate the z-scores for sample PTA 1. For more information on the use of target CVs to calculate z-scores, please see the Guide to Proficiency Testing Australia (2019).
- Z-scores and summary statistics (including the number of results) for *E. coli* were calculated from the results for the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.
- The method used has been appended to the laboratory code on the ordered z-score chart on the following page.
- Sample PTA 2 did not contain *E. coli*.

A3.2

Milk Powder - *E.coli*, Pour Plate / Petrifilm™ [$\log_{10}(\text{cfu/g})$] - PTA 1



Section A4

Enterobacteriaceae

A4.1

Milk Powder – Enterobacteriaceae, Pour Plate (cfu/g)

Lab Code	PTA 1			PTA 2			Z-Scores		Method	Medium
	Result	Log ₁₀	MU	Result	Log ₁₀	MU	PTA 1	PTA 2		
1	420	2.62	-	120	2.08	-	2.82	-0.67	PP	VRBGA (ISO)
2A	200	2.30	-	420	2.62	-	0.84	2.64	PP	VRBGA
2B	200	2.30	-	420	2.62	-	0.84	2.64	PP	VRBGA
3	190	2.28	0.13	150	2.18	0.13	0.70	-0.08	PP	VRBA
7A	40	1.60	-	50	1.70	-	-3.47 §	-2.99	PP	VRBD
7B	55	1.74	-	45	1.65	-	-2.62	-3.27 §	PP	VRBD

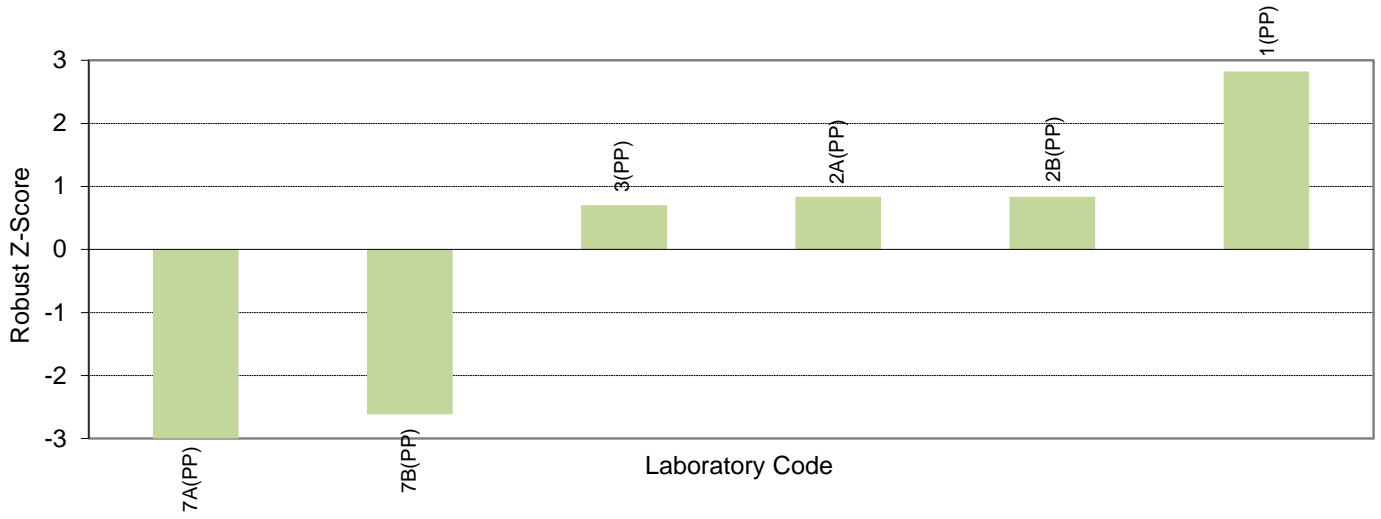
Statistic	Log ₁₀ PTA 1	Log ₁₀ PTA 2
Number of Results	22	24
Median	2.165	2.190
Normalised IQR	0.132	0.137
Uncertainty (Median)	0.035	0.035
Robust CV	6.1%	6.3%
Target SD	0.162	0.164
Target CV	7.5%	7.5%
Minimum	1.72	1.70
Maximum	2.61	2.36
Range	0.89	0.66

Notes:

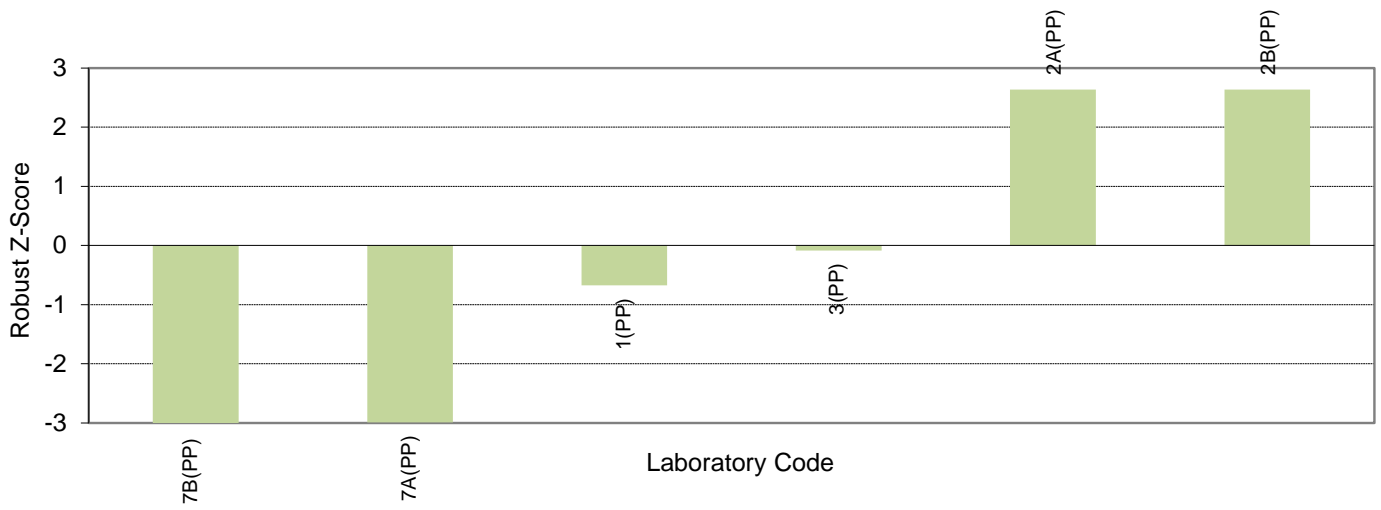
- § denotes an outlier (i.e. |z-score| ≥ 3.0).
- For the method abbreviations in the table above, PP = Pour Plate.
- Target CVs were used to calculate the robust z-scores for both samples. The target CVs chosen were 7.5% and 7.5% for samples PTA 1 and PTA 2, respectively.
- The target SDs were obtained for each sample by multiplying the target CV by the median. These values were used to calculate the z-scores for each sample. For more information on the use of target CVs to calculate z-scores, please see the Guide to Proficiency Testing Australia (2019).
- Z-scores and summary statistics (including the number of results) for Enterobacteriaceae were calculated from the results for the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.
- The method used has been appended to the laboratory code on the ordered z-score charts on the following page.

A4.2

Milk Powder - Enterobacteriaceae, Pour Plate [$\log_{10}(\text{cfu/g})$] - PTA 1



Milk Powder - Enterobacteriaceae, Pour Plate [$\log_{10}(\text{cfu/g})$] - PTA 2



Section A5

Coagulase-positive *Staphylococci*

A5.1

Milk Powder – Coagulase-positive *Staphylococci*, Spread Plate (cfu/g)

Lab Code	PTA 1			PTA 2			Z-Scores		Method	Medium
	Result	Log ₁₀	MU	Result	Log ₁₀	MU	PTA 1	PTA 2		
1	390	2.59	-	290	2.46	-	0.66	-0.40	SP	BPA
3	500	2.70	0.18	500	2.70	0.18	1.54	1.24	SP	BP
6	450	2.65	-	850	2.93	-	1.17	2.83	SP	BP

Statistic	Log ₁₀ PTA 1	Log ₁₀ PTA 2
Number of Results	19	19
Median	2.510	2.520
Normalised IQR	0.122	0.145
Uncertainty (Median)	0.035	0.042
Robust CV	4.9%	5.7%
Minimum	2.18	2.34
Maximum	2.70	2.90
Range	0.52	0.56

Notes:

1. For the method abbreviations in the table above, SP = Spread Plate.
2. Z-scores and summary statistics (including the number of results) for Coagulase-positive *Staphylococci* were calculated from the results for the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.
3. The method used has been appended to the laboratory code on the ordered z-score charts on the following page.

A5.2

Milk Powder - Coagulase-positive *Staphylococci*,
Spread Plate [$\log_{10}(\text{cfu/g})$] - PTA 1



Milk Powder - Coagulase-positive *Staphylococci*,
Spread Plate [$\log_{10}(\text{cfu/g})$] - PTA 2



Section A6

Bacillus cereus

A6.1

Milk Powder – *Bacillus cereus*, Spread Plate (cfu/g)

Lab Code	PTA 1			PTA 2			Z-Scores		Method	Medium
	Result	Log ₁₀	MU	Result	Log ₁₀	MU	PTA 1	PTA 2		
1	4300	3.63	-	1600	3.20	-	-1.46	-0.28	SP	MYP
3	3900	3.59	0.08	2300	3.36	0.08	-1.85	0.81	SP	MYP
6	400	2.60	-	600	2.78	-	-11.05 §	-3.23 §	SP	MYP

Statistic	Log ₁₀ PTA 1	Log ₁₀ PTA 2
Number of Results	19	22
Median	3.790	3.245
Normalised IQR	0.107	0.145
Uncertainty (Median)	0.031	0.039
Robust CV	2.8%	4.5%
Minimum	3.48	2.85
Maximum	3.89	3.49
Range	0.41	0.64

Note:

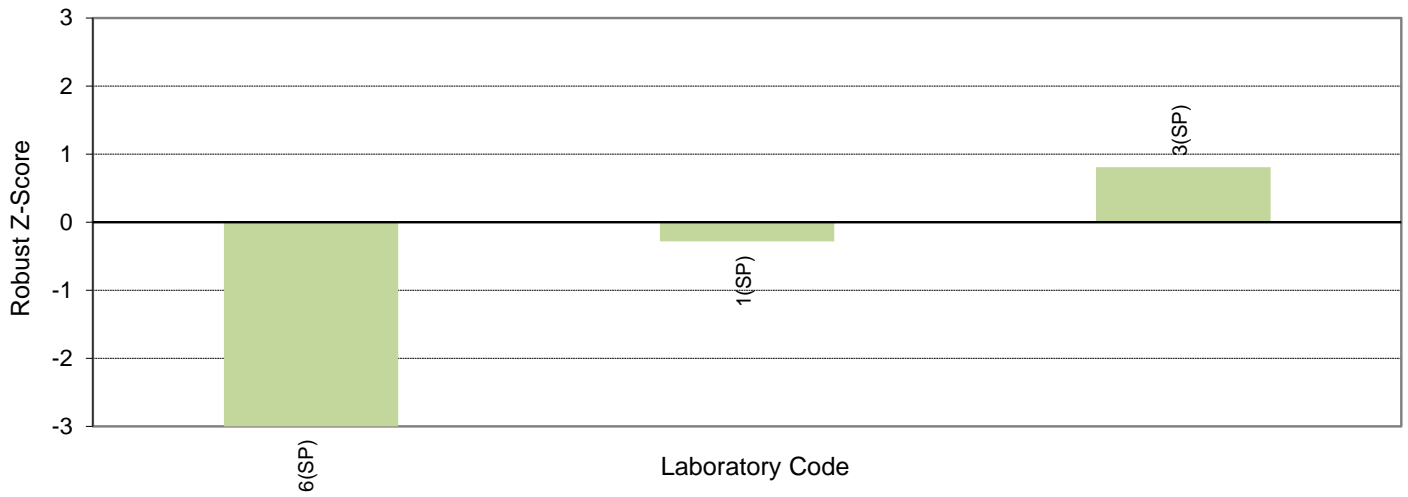
1. § denotes an outlier (i.e. |z-score| ≥ 3.0).
2. For the method abbreviations in the table above, SP = Spread Plate.
3. Z-scores and summary statistics (including the number of results) for *Bacillus cereus* were calculated from the results for the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.
4. The method used has been appended to the laboratory code on the ordered z-score charts on the following page.

A6.2

Milk Powder - *Bacillus cereus*, Spread Plate [$\log_{10}(\text{cfu/g})$] - PTA 1



Milk Powder - *Bacillus cereus*, Spread Plate [$\log_{10}(\text{cfu/g})$] - PTA 2



Section A7

Total Yeast and Mould Count

A7.1

Milk Powder – Total Yeast and Mould Count, All Methods Pooled (cfu/g)

Lab Code	PTA 1			PTA 2			Z-Scores		Method	Medium
	Result	Log ₁₀	MU	Result	Log ₁₀	MU	PTA 1	PTA 2		
1	100	2.00	-	470	2.67	-	0.78	0.45	SP	DRBCA
2A	200	2.30	-	280	2.45	-	2.90	-1.50	PP	RBCA
2B	200	2.30	-	280	2.45	-	2.90	-1.50	PP	RBCA
3	200	2.30	0.20	700	2.85	0.20	2.90	1.95	SP	DRBCA
6	400	2.60	-	1000	3.00	-	5.02 §	3.30 §	SP	DRBCA
7A	15	1.18	-	305	2.48	-	-5.04 §	-1.18	SP	DRBC
7B	20	1.30	-	310	2.49	-	-4.15 §	-1.12	SP	DRBC
8	150	2.18	-	300	2.48	-	2.02	-1.24	SP	DG18
8	80	1.90	-	540	2.73	-	0.09	0.97	Pfm	-

Statistic	Log ₁₀ PTA 1	Log ₁₀ PTA 2
Number of Results	29	32
Median	1.890	2.620
Normalised IQR	0.089	0.100
Uncertainty (Median)	0.021	0.022
Robust CV	4.7%	3.8%
Target SD	0.142	0.115
Target CV	7.5%	4.4%
Minimum	1.70	2.26
Maximum	2.08	2.83
Range	0.38	0.57

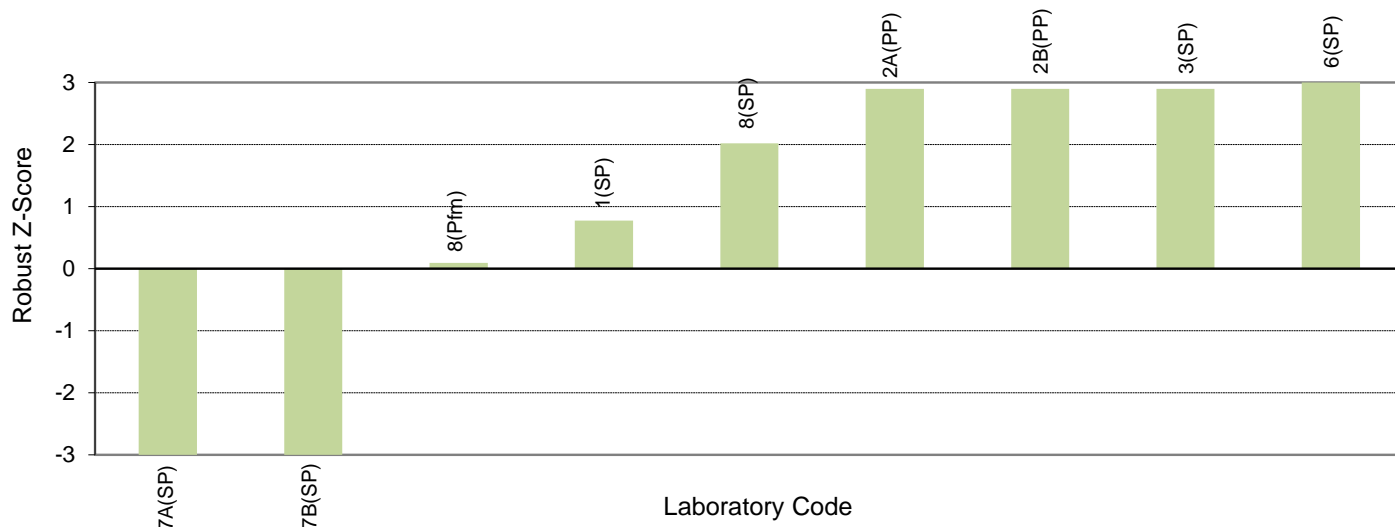
Notes:

- § denotes an outlier (i.e. |z-score| ≥ 3.0).
- For the method abbreviations in the table above, PP = Pour Plate, SP = Spread Plate and Pfm = Petrifilm™.
- All the methods were pooled when analysing the Total Yeast and Mould Count results.
- Target CVs were used to calculate the robust z-scores for both samples. The target CVs chosen were 7.5% and 4.4% for samples PTA 1 and PTA 2, respectively.
- The target SDs were obtained for each sample by multiplying the target CV by the median. These values were used to calculate the z-scores for each sample. For more information on the use of target CVs to calculate z-scores, please see the Guide to Proficiency Testing Australia (2019).
- Z-scores and summary statistics (including the number of results) for Total Yeast and Mould Count were calculated from the results for the Global Proficiency Ltd DairyChek Microbiology program, using the same samples.
- Laboratory codes 2A and 2B reported their Yeast Count and Mould Count separately, as well as the Total Count, for Total Yeast and Mould Count for each sample.

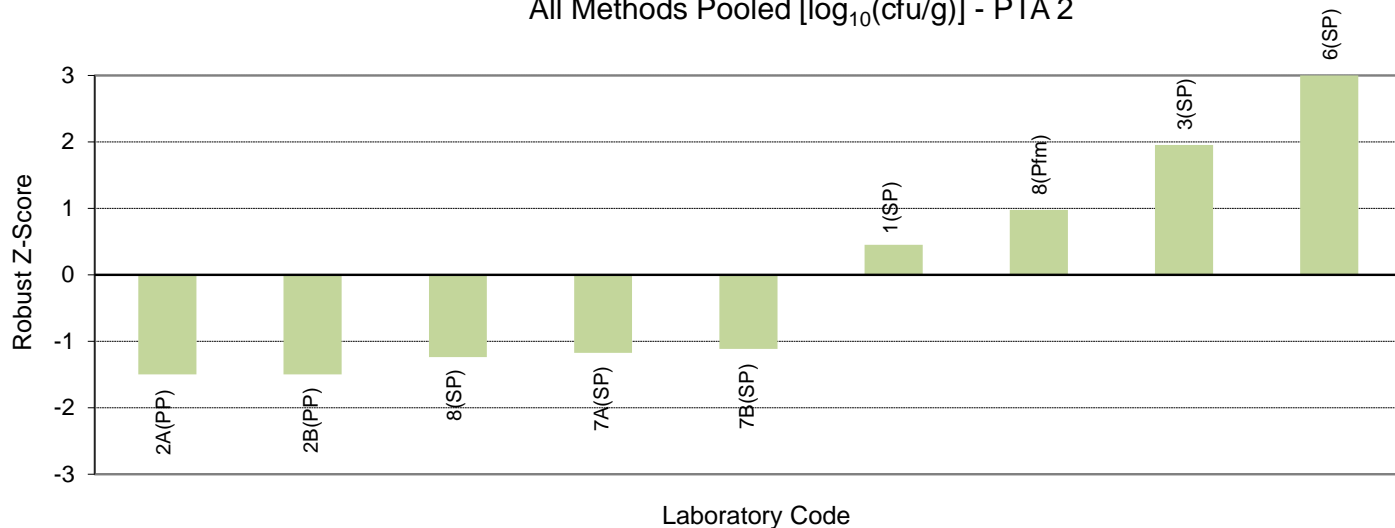
A7.2

8. Laboratory code 6 reported their Yeast Count and Mould Count separately for Total Yeast and Mould Count for each sample. These counts were added together to obtain their Total Yeast and Mould Count. This laboratory reported that sample PTA 1 contained only Yeasts.
9. Laboratory codes 7A and 7B reported their Yeast Count and Mould Count separately for Total Yeast and Mould Count for each sample. These counts were added together to obtain their Total Yeast and Mould Count.
10. The method used has been appended to the laboratory code on the ordered z-score charts below.

Milk Powder - Total Yeast and Mould Count,
All Methods Pooled [$\log_{10}(\text{cfu/g})$] - PTA 1



Milk Powder - Total Yeast and Mould Count,
All Methods Pooled [$\log_{10}(\text{cfu/g})$] - PTA 2



APPENDIX B

Homogeneity Testing and Stability

B1.1

Homogeneity Testing

Samples from PTA 1, chosen at random, were retained for homogeneity testing by Global Proficiency Ltd (New Zealand). These samples were tested for Aerobic Plate Count. The samples were tested in duplicate using 0.1 mL volumes spread-plated onto Plate Count Agar with incubation at 30°C for up to 72 hours. The results of this homogeneity testing appear in the following table.

Aerobic Plate Count (cfu/g)				
PTA 1				
Sample	Result A	Log ₁₀ A	Result B	Log ₁₀ B
2	26000	4.41	33000	4.52
11	31000	4.49	28000	4.45
27	30000	4.48	33000	4.52
33	34000	4.53	31000	4.49
48	33000	4.52	36000	4.56

The analysis of the homogeneity data indicated that the samples were sufficiently homogeneous for use in the program. Therefore, any participant results identified as outliers or false results cannot be attributed to sample variability.

Stability Of The Samples

The stability of the samples during transit is no longer an issue, as samples are now shipped using specialised packaging which can keep the samples frozen to destination. The stability trials undertaken for previous rounds of this program also included conditions of mild temperature abuse, which supported the need for good packaging to keep the samples frozen during transit.

APPENDIX C

Instructions to Participants and Results Sheets

PROFICIENCY TESTING AUSTRALIA
Non-Pathogens in Food
Proficiency Testing Program
Round 28, May 2020



INSTRUCTIONS TO PARTICIPANTS

On receipt of samples:

Open the container immediately and check the contents are in order.

- Record the temperature of the samples.
- Return the contents to the original packaging.
- Transfer the samples to a refrigerator (2–5 °C) for storage prior to testing.
- Protect the samples from light.

Prior to testing please note:

- ❖ The samples available for testing in this program are as follows:

Two approx. 30 g samples, one containing a whole milk powder matrix (labelled PTA 1), and one containing a skim milk powder matrix (labelled PTA 2), with two accompanying freeze-dried vials are provided for microbiological analysis. The powder samples are provided in sealed foil laminate sachets and the vials are glass – both should be stored at 2–5 °C prior to testing. These samples may be tested for some or all of the following tests, according to each laboratory's requirements:

- | | |
|---|--------------------------|
| • Aerobic Plate Count | • Coliforms |
| • <i>E. coli</i> | • Enterobacteriaceae |
| • Coagulase-positive <i>Staphylococci</i> | • <i>Bacillus cereus</i> |
| • Total Yeast and Mould Count | |

- ❖ It is strongly recommended that testing is initiated within 48 hours of receipt of the samples.
- ❖ In order for results to be analysed, laboratories are requested to report quantitative results, so **please ensure adequate dilutions are prepared**. Samples may contain up to 500 cfu/g coliforms, 500 cfu/g *E. coli*, 500 cfu/g Enterobacteriaceae, 500 cfu/g Coagulase-positive *Staphylococci*, 8,000 cfu/g *Bacillus cereus*, 300 cfu/g yeasts and moulds, and 50,000 cfu/g aerobic mesophilic organisms per gram. **Results should not be reported as “greater than” as such data cannot be statistically analysed.**
- ❖ For each of the tests being performed, the laboratory may report results for up to two different methods. If a Pour Plate or Spread Plate technique is used, please record the medium type used in the testing process, e.g. Coliforms: “VRBA”, Moulds: “DRBCA”.
- ❖ For results using other methods than those listed, the method used should be clearly written in the **Method** column of the **Results Sheet**.
- ❖ **Please note:** For the Coliforms, *E. coli*, Enterobacteriaceae, *Bacillus cereus* and Coagulase-positive *Staphylococci* tests, we request that participants use plating methods and do not submit results via Most Probable Number (MPN).

C1.2

- ❖ Laboratories are also requested to calculate and report an estimate of measurement uncertainty (MU) for each reported measurement result. All estimates of measurement uncertainty must be given as a 95% confidence interval (coverage factor $k \approx 2$). You may provide MU as a \pm value in log format (preferred), or a range if reported in standard form, e.g. 7.5×10^3 cfu/g.

Instructions

You have been supplied with freeze dried vials and accompanying whole milk powder matrices in foil laminate sachets. Please find below instructions for the re-hydration and preparation of the freeze-dried vials and steps for the preparation of the matrix.

1. Re-hydrate the freeze-dried vials by adding 3.0 mL of sterile diluent (e.g. 0.1% (w/v) peptone and 0.85% (w/v) NaCl (ISO 6887-1)) at room temperature.
2. Allow standing at room temperature for 10 minutes.
3. Mix the vial contents using a vortex mixer for 15 seconds.
4. Aseptically open the sachets. Weigh out 10 g for each sample. Add 90 mL diluent. Mix to dissolve the milk powder. Add 1 mL of the rehydrated vial contents and homogenize/mix. This is now your prepared **homogenate**, i.e. simulated sample, and should be referred to as 10^{-1} . Continue as per your Standard methods.
5. Report results on the attached **Results Sheet** to the specified number of significant figures. Laboratories should report their results in the row corresponding to the method used for each particular test.
6. Return Results Sheets, 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 **Tuesday 9 June 2020**. Results reported later than this date may not be analysed in the final report.

Participants are advised that there may be instances where a particular test, using a particular method, may not be assessed due to insufficient participant numbers.

PROFICIENCY TESTING AUSTRALIA
Non-Pathogens in Food Proficiency Testing Program
Round 28, May 2020
RESULTS SHEET 1

 Laboratory Code:

Date Samples Received: _____

Temperature of samples: _____ °C

Determination	Report results to nearest	Sample 1		Sample 2		Test Date	Method (see Note)
		Result	MU	Result	MU		
Aerobic Plate Count	2 sig. figures (cfu/g)						<input type="checkbox"/> Pour plate <input type="checkbox"/> Spread plate Medium used: <input type="checkbox"/> Petrifilm™ <input type="checkbox"/> Other:
Coliforms	2 sig. figures (cfu/g)						<input type="checkbox"/> Pour plate <input type="checkbox"/> Spread plate Medium used: <input type="checkbox"/> Petrifilm™ <input type="checkbox"/> Other:
<i>E. coli</i>	2 sig. figures (cfu/g)						<input type="checkbox"/> Pour plate <input type="checkbox"/> Spread plate Medium used: <input type="checkbox"/> Petrifilm™ <input type="checkbox"/> Other:
Enterobacteriaceae	2 sig. figures (cfu/g)						<input type="checkbox"/> Pour plate <input type="checkbox"/> Spread plate Medium used: <input type="checkbox"/> Petrifilm™ <input type="checkbox"/> Other:

PROFICIENCY TESTING AUSTRALIA
Non-Pathogens in Food Proficiency Testing Program
Round 28, May 2020
RESULTS SHEET 2

Laboratory Code:

Determination	Report results to nearest	Sample 1		Sample 2		Test Date	Method (see Note)
		Result	MU	Result	MU		
Coagulase-positive <i>Staphylococci</i>	2 sig. figures (cfu/g)						<input type="checkbox"/> Pour plate <input type="checkbox"/> Spread plate Medium used:
							<input type="checkbox"/> Petrifilm™ <input type="checkbox"/> Other:
<i>Bacillus cereus</i>	2 sig. figures (cfu/g)						<input type="checkbox"/> Spread plate Medium used:
							<input type="checkbox"/> Other:
Total Yeasts & Moulds	2 sig. figures (cfu/g)						<input type="checkbox"/> Pour plate <input type="checkbox"/> Spread plate Medium used:
							<input type="checkbox"/> Petrifilm™ <input type="checkbox"/> Other:

Note₁: For each of the tests being performed, the laboratory may report results for up to two different methods. If a Pour Plate or Spread Plate technique is used, please record the medium type used in the testing process, e.g. Coliforms: "VRBA", Moulds: "DRBCA".

Note₂: For results using other methods than those listed, the method used should be clearly written in the Method column.

Print Name: _____

Signature & Date: _____

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