Fapas® – Food Microbiology Proficiency Test Report 238

November-December 2019

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PARTICIPANT LABORATORY NUMBER

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Laboratory numbers are displayed in SecureWeb next to the download link for this report.

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SUMMARY

1. The test material for Fapas® – Food Microbiology distribution 238 was dispatched in November 2019. Test materials for 10 proficiency tests were available in this distribution:

   M238e04 Enumeration of Enterobacteriaceae/coliforms/*Escherichia coli* (equivalent to 10 g of beef)

   M238e09 Aerobic Plate count (equivalent to 10 g of chicken)

   M238e15 Enumeration of Yeasts and Moulds [SUM] (equivalent to 10 g of flour)

   M238e17 Enumeration of *Campylobacter* spp. (equivalent to 10 g of chicken)

   M238d02 Detection of *Listeria monocytogenes*/*Listeria* spp. (equivalent to 25 g chicken x 2)

   M238d07 Detection of *Salmonella* spp. (equivalent to 25 g of ground pepper x 2)

   M238d11 Detection of *Escherichia coli* O157:H7 (equivalent to 25 g of sprouting seeds and lettuce x2)

2. For each proficiency test in enumeration, an assigned value (x_a) was determined. This was used in conjunction with the standard deviation for proficiency (σ_p) to calculate a z-score for each result.

3. Qualitative results for the proficiency tests in detection are assessed based on the presence or absence of the target organism in **both** of the test materials issued.

4. Results and assessments for the proficiency tests in enumeration are summarised as follows:

proficiency test	assigned value, x_a $\log_{10}$cfu/g	number of scores, $\lvert z\rvert \leq 2$	total number of scores	% $\lvert z\rvert \leq 2$
enumeration of enterobacteriaceae in beef	3.82	91	95	96
enumeration of coliforms in beef	3.81	84	94	89
enumeration of *Escherichia coli* in beef	3.77	96	108	89
aerobic plate count in chicken	4.87	54	63	86
enumeration of yeasts and moulds in flour	3.90	55	60	92
enumeration of *Campylobacter* spp. in chicken	3.55	32	34	94

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5. Results and assessments for the proficiency tests in detection are summarised as follows:

proficiency test	intended result	number of satisfactory assessments	total number of assessments	satisfactory /agreement with intended result %	false negatives %	false positives %
detection of *Listeria monocytogenes* in chicken	test material A not detected test material B detected	27	27	100	0	0
detection of *Listeria* spp. in chicken	test material A not detected test material B detected	15	18	83	15	0
detection of *Salmonella* spp. in ground pepper	test material A not detected test material B detected	21	26	81	15	12
detection of *E. coli* O157:H7 in sprouting seeds and lettuce	test material A not detected test material B detected	15	18	83	11	17

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CONTENTS

1. INTRODUCTION 7

1.1. Proficiency Testing 7

2. TEST MATERIAL 7

2.1. Preparation 7
2.2. Homogeneity and Validation 7
2.3. Dispatch 7
2.4. Storage and Preparation Instructions 7

3. RESULTS 7

4. STATISTICAL EVALUATION OF RESULTS 8

4.1. Calculation of the Assigned Value, x_a 8
4.2. Standard Deviation for Proficiency, σ_p 8
4.3. Individual z-Scores and Assessments 9

5. INTERPRETATION OF SCORES AND ASSESSMENTS 9

6. REFERENCES 10

TABLES

Table 1: Results and z-Scores for enterobacteriaceae in beef 11
Table 2: Results and z-Scores for coliforms in beef 16
Table 3: Results and z-Scores for *Escherichia coli* in beef 21
Table 4: Results and z-Scores for aerobic plate count in chicken 26
Table 5: Results and z-Scores for yeasts and moulds in flour 29
Table 6: Results and z-Scores for *Campylobacter* spp. in chicken 32
Table 7: Results and Assessments for *Listeria monocytogenes* and *Listeria* spp. in chicken 34
Table 8: Results and Assessments for *Salmonella* spp. in ground pepper 36
Table 9: Results and Assessments for *E. coli* O157:H7 in sprouting seeds and lettuce 37
Table 10: Assigned Values and Standard Deviations for Enumeration Tests 38
Table 11: Number and Percentage of z-Scores where $|z| \leq 2$ 38
Table 12: Intended Results for Proficiency Tests in Detection 39
Table 13: Number and Percentage of Satisfactory Assessments and False Results for Proficiency Tests in Detection 39

FIGURES

Figure 1: z-Scores for enterobacteriaceae in beef 40
Figure 2: z-Scores for coliforms in beef 41
Figure 3: z-Scores for *Escherichia coli* in beef 42
Figure 4: z-Scores for aerobic plate count in chicken 43
Figure 5: z-Scores for yeasts and moulds in flour 44
Figure 6: z-Scores for *Campylobacter* spp. in chicken 45

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APPENDICES

APPENDIX I:	Organisms present in Fapas® – Food Microbiology Test Materials	46
APPENDIX II:	Verification of Positive Qualitative Test Materials	47
APPENDIX III:	Analytical Methods Used by Participants	48
APPENDIX IV:	Fapas® SecureWeb, Protocol and Contact Details	75

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1. INTRODUCTION

1.1. Proficiency Testing

Proficiency testing aims to provide an independent assessment of the competence of participating laboratories. Together with the use of validated methods, proficiency testing is an essential element of laboratory quality assurance.

Further details of the Fapas® – Food Microbiology proficiency testing scheme are available in our protocols [4, 5].

2. TEST MATERIAL

2.1. Preparation

Preparation of the samples for this proficiency test was sub-contracted to a laboratory meeting the quality requirements of the scheme's accreditation [3].

Fapas® – Food Microbiology test materials include background flora to simulate real conditions. Information for these organisms is given in APPENDIX I.

Samples were stored at +4°±2°C until dispatch.

2.2. Homogeneity and Validation

For the proficiency tests in enumeration randomly selected test materials were analysed in duplicate by a laboratory meeting the quality requirements of the scheme's accreditation [3].

These data showed sufficient homogeneity and were not included in the subsequent calculation of the assigned values.

For the proficiency tests in detection, ten percent of the batch of test materials prepared was analysed to verify the presence/absence of the target organism. In addition, two of each of the test materials positive for the target organism were also analysed by the most probable number technique to verify the level of organisms present. The data obtained is given in APPENDIX II.

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2.3. Dispatch

The start date was 26 November 2019. Test materials were sent to 267 participants.

2.4. Storage and Preparation Instructions

Instructions regarding sample storage and preparation were made available on the Fapas® website [6].

3. RESULTS

The instructions for reporting results were as follows:

- Start the analysis between 26 November 2019 and 05 December 2019.
- The results for enumeration tests must be reported as cfu/g.

- The results for detection tests must be reported as detected/not detected in 25 g (in English).

Results were submitted by 249 participants (93%) before the closing date for this test, 17 December 2019.

Each participant was given a laboratory number, assigned in order of receipt of results. The reported results are given in Table 1 to Table 9.

The analytical methods used by each participant are summarised in APPENDIX III.

4. STATISTICAL EVALUATION OF RESULTS

The results submitted by participants for the proficiency tests in enumeration were statistically analysed in order to derive assigned values. The assigned values were then used in combination with the standard deviation for proficiency, σ_p, to calculate a z-score [7] for each result. The procedure is detailed in the relevant protocols [4, 5].

Further background on the procedure followed can be found in the IUPAC International Harmonised Protocol for the Proficiency Testing of Analytical Chemistry Laboratories [8].

4.1. Calculation of the Assigned Value, x_a

The assigned value, x_a, for each enumeration test was derived from the consensus of the results submitted by participants. The procedure used to derive this consensus involved:

- transformation of participants results to $\log_{10}$cfu/g, to obtain a normal distribution,
- removal of non-numerical results i.e. qualitative or semi-quantitative results.

For the Enterobacteriaceae, coliforms and *E. coli* enumerations in beef and the yeasts and moulds enumeration in flour this procedure was straightforward, and the robust mean was chosen as the assigned value.

For the aerobic plate count in chicken the distribution was slightly skewed and the mode was considered the best estimate of consensus. The kernel density plot of the distribution of results is presented as an insert to Figure 4.

For the *Campylobacter* spp. enumeration in chicken the distribution was skewed by a number of results and the mode was considered the best estimate of consensus. The kernel density plot of the distribution of results is presented as an insert to Figure 6.

The assigned values for the proficiency tests in enumeration are shown in Table 10.

4.2. Standard Deviation for Proficiency, σ_p

The standard deviation for proficiency, σ_p, was set at a value that reflects best practice for the analyses in question. The Fapas® Advisory Committee has agreed that this value corresponds to 0.25 $\log_{10}$ cfu/g for all the proficiency tests in this distribution, except for the enumeration of *Campylobacter* spp. in chicken, for this proficiency test the value corresponds to 0.35 $\log_{10}$ cfu/g.

The value for σ_p used to calculate z-scores from the results reported for the enumeration tests is given in Table 10.

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4.3. Individual z-Scores and Assessments

Participants' z-scores were calculated as:

$$z = \frac{(\log x - \log x_a)}{\sigma_p}$$

where x = the participant's reported result,
x_a = the assigned value
and σ_p = the standard deviation for proficiency.

Participants' z-scores for the proficiency tests in enumeration are given in Table 1 to Table 6 and shown as histograms in Figure 1 to Figure 6. The number and percentage of z-scores in the range $-2 \leq z \leq 2$ for the enumeration tests are given in Table 11.

It is possible for the z-scores published in this report to differ slightly from the z-score that can be calculated using the formula given above. These differences arise from the necessary rounding of the actual assigned values and standard deviations for proficiency prior to their publication in Table 10.

Participants' results for the proficiency tests in detection are assessed based on the presence or absence of the target organism in **both** of the test materials issued. Assessments are given in Table 7 to Table 9.

Intended results for these detection tests are shown in Table 12.

The number and percentage of satisfactory assessments are given in Table 13.

5. INTERPRETATION OF SCORES AND ASSESSMENTS

In normal circumstances, over time, about 95% of z-scores will lie in the range $-2 \leq z \leq 2$. Occasional scores in the range $2 < |z| < 3$ are to be expected, at a rate of 1 in 20. Whether or not such scores are of importance can only be decided by considering them in the context of the other scores obtained by that laboratory.

Scores where $|z| > 3$ are to be expected at a rate of about 1 in 300. Given this rarity, such z-scores very strongly indicate that the result is not fit-for-purpose and almost certainly requires investigation.

The consideration of a set or sequence of z-scores over time provides more useful information than a single z-score. Examples of suitable methods of comparison are provided in the IUPAC International Harmonised Protocol for the Proficiency Testing of Analytical Chemistry Laboratories [8].

Results submitted by participants for detections tests are assessed as either satisfactory (S) or not satisfactory (NS) as compared to the intended result.

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6. REFERENCES

1 Adobe Approved Trust List, https://helpx.adobe.com/acrobat/kb/approved-trust-list2.html#Whatisit accessed 13/11/2018.

2 GlobalSign PDF Signing Tool, https://www.globalsign.com/en/digital-signatures/ accessed 13/11/2018.

3 ISO/IEC 17043:2010, Conformity assessment – General requirements for proficiency testing.

4 Fapas®, 2017, Protocol for Proficiency Testing Schemes, Version 6, April 2017, Part 1 – Common Principles.

5 Fapas®, 2017, Protocol for Proficiency Testing Schemes, Version 5, April 2017, Part 3 – Fapas® Food Microbiology scheme (FEPAS).

6 Fapas® – Food Microbiology safety data sheet and preparation instructions, https://fapas.com/technical-documentation, accessed 13/11/2018.

7 AMC Tech Brief No. 74, z-Scores and other scores in chemical proficiency testing – their meanings, and some common misconceptions, Anal. Methods, 2016, 8, 5553.

8 Thompson, M., Ellison, S.L.R. and Wood, R., 2006, The International Harmonised Protocol for the Proficiency Testing of Analytical Chemistry Laboratories, *Pure Appl. Chem.*, **78**, No. 1, 145–196.

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Table 1: Results and z-Scores for enterobacteriaceae in beef

laboratory number	enterobacteriaceae			
	assigned value 3.82 log_{10}cfu/g			
	result, cfu/g	result, log_{10}cfu/g	z-score	MPN
001	7.7E+3	3.886	0.3	no
002	6.2E+3	3.792	-0.1	NO
003				
004				
005	5.6e3	3.748	-0.3	Yes
006	4.34E+3	3.637	-0.7	NO
007	6.8E+3	3.833	0.1	no
009				
010	1.1E+4	4.041	0.9	1
011	5270	3.722	-0.4	no
012	9.8E+3	3.991	0.7	no
013	7.3E+3	3.863	0.2	no
014	9.6E+4	4.982	**4.7**	no
015	5.7E+3	3.756	-0.2	NO
017	5400	3.732	-0.3	NO
019	4.2E+3	3.623	-0.8	NO
020	7.4E+3	3.869	0.2	No
022	5.9E+3	3.771	-0.2	no
023	7.4E+3	3.869	0.2	no
025	7.3E+3	3.863	0.2	NO
026				
027	5.40E+03	3.732	-0.3	No
028	6.0E+3	3.778	-0.2	yes
029	1.06E+4	4.025	0.8	yes
030	5.05E+03	3.703	-0.5	NO

z-scores outside |z| >2 are shown in **bold,** see Section 5
MPN - most probable number technique used

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Table 1 (continued): Results and z-Scores for enterobacteriaceae in beef

laboratory number		enterobacteriaceae			
		assigned value 3.82 log_{10}cfu/g			
		result, cfu/g	result, log_{10}cfu/g	z-score	MPN
031		11825	4.073	1.0	no
034		15454.5	4.189	1.5	yes
036		4.6E+3	3.663	-0.6	no
038		8.1E+3	3.908	0.4	no
040		4.8E+3	3.681	-0.5	no
041		1.0E+4	4.000	0.7	no
043		4.1E+3	3.613	-0.8	NO
044		7888	3.897	0.3	no
045		9.6E+3	3.982	0.7	NO
046		7.0E+3	3.845	0.1	no
048		4.0E+3	3.602	-0.9	no
055		6.7E+3	3.826	0.0	No
059		8636	3.936	0.5	No
062		2.5E+3	3.398	-1.7	no
063		3640	3.561	-1.0	no
064		8.6E+3	3.934	0.5	no
065		5.5E+3	3.740	-0.3	no
067		7.1E+3	3.851	0.1	yes
070					
074	*	6.1E+3	3.785	-0.1	no
075					
078					
079					
080		7.8E+3	3.892	0.3	yes
083		4.0E+3	3.602	-0.9	No

* tested outside of the time frame recommended for analysis
MPN - most probable number technique used

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Table 1 (continued): Results and z-Scores for enterobacteriaceae in beef

laboratory number	enterobacteriaceae			
	assigned value 3.82 log_{10}cfu/g			
	result, cfu/g	result, log_{10}cfu/g	z-score	MPN
085	7.0E+3	3.845	0.1	pour
087	6.68E+3	3.825	0.0	No
088	2.4E+3	3.380	-1.8	no
091	1.1E+4	4.041	0.9	no
094				
096				
106	9.1E+3	3.959	0.6	No
109	8.7E+3	3.940	0.5	yes
110	4.2E+3	3.623	-0.8	no
113	4.0E+3	3.602	-0.9	no
119	2.9E+3	3.462	-1.4	no
120				
123	9800	3.991	0.7	No
124	6.4E+2	2.806	**-4.0**	no
127	6.9E+3	3.839	0.1	no
131	7.8E+3	3.892	0.3	no
132	6.3E+3	3.799	-0.1	no
133	9.2E+3	3.964	0.6	no
134	5.5E+3	3.740	-0.3	NO
138				
146				
147	4.8E+3	3.681	-0.5	No
152				
155				
156	7.1E+3	3.851	0.1	no

z-scores outside |z| >2 are shown in **bold,** see Section 5
MPN - most probable number technique used

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Table 1 (continued): Results and z-Scores for enterobacteriaceae in beef

laboratory number		enterobacteriaceae			
		assigned value 3.82 log_{10}cfu/g			
		result, cfu/g	result, log_{10}cfu/g	z-score	MPN
157		9.5E+3	3.978	0.6	No
158	*	67272	4.828	**4.0**	no
160		6.7E+3	3.826	0.0	NO
161		7.6E+3	3.881	0.3	no
163		1.1E+4	4.041	0.9	No
167		6.8E+3	3.833	0.1	no
168	*	7E+3	3.845	0.1	No
169		6.3E+3	3.799	-0.1	NO
170		6.6E+3	3.820	0.0	no
172		10000	4.000	0.7	No
175					
188		8.3E+3	3.919	0.4	yes
193		5400.00	3.732	-0.3	NO
196		9100	3.959	0.6	no
199		7.6E+3	3.881	0.3	no
200	*	5.2E+3	3.716	-0.4	yes
202		7.6E+3	3.881	0.3	No
203		5500	3.740	-0.3	no
204		6.4E+3	3.806	0.0	NO
205		4500	3.653	-0.7	no
206		7000	3.845	0.1	no
209					
210		5700	3.756	-0.2	yes
212		7.2E+3	3.857	0.2	NO
216		8.3E+3	3.919	0.4	no

z-scores outside |z| >2 are shown in **bold,** see Section 5
* tested outside of the time frame recommended for analysis
MPN - most probable number technique used

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Table 1 (continued): Results and z-Scores for enterobacteriaceae in beef

laboratory number		enterobacteriaceae			
		assigned value 3.82 log_{10}cfu/g			
		result, cfu/g	result, log_{10}cfu/g	z-score	MPN
217		1.38E+4	4.140	1.3	No
218		7.4E+3	3.869	0.2	NO
228					
231		9.6E+3	3.982	0.7	NO
233		5.3E+3	3.724	-0.4	no
234		4000	3.602	-0.9	no
235					
236		7.8E+3	3.892	0.3	no
241		8800	3.944	0.5	no
243		5.0E+3	3.699	-0.5	no
246		6200	3.792	-0.1	No
247		2.9E+3	3.462	-1.4	no
248	*	7.2E+2	2.857	**-3.8**	NO
249	*	3650	3.562	-1.0	no

z-scores outside |z| >2 are shown in **bold,** see Section 5
* tested outside of the time frame recommended for analysis
MPN - most probable number technique used

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Table 2: Results and z-Scores for coliforms in beef

laboratory number	coliforms			
	assigned value 3.81 log_{10}cfu/g			
	result, cfu/g	result, log_{10}cfu/g	z-score	MPN
001	7.1E+3	3.851	0.2	no
002	5.2E+3	3.716	-0.4	NO
003	1.2E+4	4.079	1.1	No
004	7.2E+3	3.857	0.2	no
005	4.1e3	3.613	-0.8	Yes
006	4.9E+3	3.690	-0.5	NO
007	7.3E+3	3.863	0.2	no
009	6.1E+4	4.785	**3.9**	YES
010	1.2E+4	4.079	1.1	1
011				
012				
013	7.2E+3	3.857	0.2	no
014	7.4E+4	4.869	**4.2**	no
015	5.6E+3	3.748	-0.2	NO
017	5500	3.740	-0.3	NO
019	4.0E+3	3.602	-0.8	NO
020	7.0E+3	3.845	0.1	No
022	8.7E+3	3.940	0.5	no
023	7.9E+3	3.898	0.4	no
025				
026	>1100	0.000		Yes
027				
028	5.59E+3	3.747	-0.2	yes
029	1.03E+4	4.013	0.8	yes
030	5.7E+03	3.756	-0.2	NO

z-scores outside |z| >2 are shown in **bold,** see Section 5
MPN - most probable number technique used

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Table 2 (continued): Results and z-Scores for coliforms in beef

laboratory number	coliforms			
	assigned value 3.81 log_{10}cfu/g			
	result, cfu/g	result, log_{10}cfu/g	z-score	MPN
031	13250	4.122	1.3	no
034	0			yes
036	2.4E+4	4.380	**2.3**	yes
038				
040				
041				
043	4.0E+3	3.602	-0.8	NO
044	7888	3.897	0.3	no
045	1.1E+4	4.041	0.9	NO
046	6.4E+3	3.806	0.0	no
048	4.1E+3	3.613	-0.8	no
055	6.0E+3	3.778	-0.1	No
059	8636	3.936	0.5	No
062	2.9E+3	3.462	-1.4	no
063	3550	3.550	-1.0	no
064	8.5E+3	3.929	0.5	no
065	4.0E+3	3.602	-0.8	no
067	less than 10	0.000		yes
070	8000	3.903	0.4	no
074				
075	6.2E+3	3.792	-0.1	no
078	8.0E+3	3.903	0.4	yes
079	240	2.380	**-5.7**	Yes
080	6.8E+3	3.833	0.1	yes
083	5.5E+3	3.740	-0.3	NO

z-scores outside |z| >2 are shown in **bold,** see Section 5
MPN - most probable number technique used

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Table 2 (continued): Results and z-Scores for coliforms in beef

laboratory number	coliforms			
	assigned value 3.81 log_{10}cfu/g			
	result, cfu/g	result, log_{10}cfu/g	z-score	MPN
085	7.0E+3	3.845	0.1	pour
087				
088				
091	1.0E+4	4.000	0.8	no
094	6250	3.796	-0.1	NO
096	8.108E+3	3.909	0.4	no
106	6.8E+3	3.833	0.1	No
109	7.7E+3	3.886	0.3	yes
110	4.0E+3	3.602	-0.8	no
113	1.8E+3	3.255	**-2.2**	no
119				
120	3.9E+3	3.591	-0.9	No
123				
124	7.6E+2	2.881	**-3.7**	no
127	6.8E+3	3.833	0.1	no
131	7.6E+3	3.881	0.3	no
132	5.2E+3	3.716	-0.4	no
133	2.0E+3	3.301	-2.0	no
134	4.2E+3	3.623	-0.7	NO
138	2.4E+4	4.380	**2.3**	yes
146	3.7E+3	3.568	-1.0	no
147	7.5E+3	3.875	0.3	yes
152	5.6E+3	3.748	-0.2	NO
155				
156				

z-scores outside |z| >2 are shown in **bold,** see Section 5
MPN - most probable number technique used

NOT CONTROLLED WHEN PRINTED

Table 2 (continued): Results and z-Scores for coliforms in beef

laboratory number		coliforms			
		assigned value 3.81 log_{10}cfu/g			
		result, cfu/g	result, log_{10}cfu/g	z-score	MPN
157		8.2E+3	3.914	0.4	No
158	*	55454	4.744	**3.7**	no
160		5.4E+3	3.732	-0.3	NO
161		6.8E+3	3.833	0.1	no
163		1.0E+4	4.000	0.8	No
167		3.2E+3	3.505	-1.2	no
168	*	6.9E+3	3.839	0.1	No
169		6.5E+3	3.813	0.0	NO
170		6.4E+3	3.806	0.0	no
172		9500	3.978	0.7	No
175		6.3E+3	3.799	0.0	yes
188		8.3E+3	3.919	0.4	yes
193					
196		6800	3.833	0.1	no
199		7.5E+3	3.875	0.3	no
200					
202		9.2E+3	3.964	0.6	No
203		10000	4.000	0.8	no
204		4.6E+3	3.663	-0.6	NO
205		4000	3.602	-0.8	no
206		6000	3.778	-0.1	no
209		4600	3.663	-0.6	Yes
210		6400	3.806	0.0	yes
212		8.6E+3	3.934	0.5	NO
216		7.6E+3	3.881	0.3	no

z-scores outside |z| >2 are shown in **bold,** see Section 5
* tested outside of the time frame recommended for analysis
MPN - most probable number technique used

NOT CONTROLLED WHEN PRINTED

Table 2 (continued): Results and z-Scores for coliforms in beef

laboratory number		coliforms			
		assigned value 3.81 log_{10}cfu/g			
		result, cfu/g	result, log_{10}cfu/g	z-score	MPN
217		4.15E+3	3.618	-0.8	Yes
218		2.3E+4	4.362	**2.2**	YES
228		1.3E+4	4.114	1.2	no
231		1.0E+4	4.000	0.8	NO
233		6.0E+3	3.778	-0.1	no
234		3800	3.580	-0.9	no
235		4.3E+3	3.633	-0.7	no
236		6.2E+3	3.792	-0.1	no
241		9300	3.968	0.6	yes
243		0			no
246		6700	3.826	0.1	No
247		4.6E+3	3.663	-0.6	no
248	*	2.3E+2	2.362	**-5.8**	YES
249	*	4500	3.653	-0.6	no

z-scores outside |z| >2 are shown in **bold,** see Section 5
* tested outside of the time frame recommended for analysis
MPN - most probable number technique used

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Table 3: Results and z-Scores for *Escherichia coli* in beef

laboratory number	*Escherichia coli*			
		assigned value 3.77 log_{10}cfu/g		
	result, cfu/g	result, log_{10}cfu/g	z-score	MPN
001	7.1E+3	3.851	0.3	no
002	5.2E+3	3.716	-0.2	NO
003	1.1E+4	4.041	1.1	No
004	6.9E+3	3.839	0.3	no
005	4.0e3	3.602	-0.7	Yes
006	4.9E+3	3.690	-0.3	NO
007	6.7E+3	3.826	0.2	no
009	6.1E+4	4.785	**4.0**	YES
010	6.8E+3	3.833	0.2	1
011	5180	3.714	-0.2	no
012				
013	7.3E+3	3.863	0.4	no
014	8.5E+4	4.929	**4.6**	no
015	5.3E+3	3.724	-0.2	NO
017	3700	3.568	-0.8	NO
019	4.1E+3	3.613	-0.6	NO
020	6.0E+3	3.778	0.0	No
022	2.1E+4	4.322	**2.2**	no
023	8.1E+3	3.908	0.5	no
025	6.1E+3	3.785	0.0	NO
026	>1100	0.000		Yes
027				
028	6.18E+3	3.791	0.1	yes
029	1.25E+4	4.097	1.3	yes
030	5.9E+03	3.771	0.0	NO

z-scores outside |z| >2 are shown in **bold,** see Section 5
MPN - most probable number technique used

NOT CONTROLLED WHEN PRINTED

Table 3 (continued): Results and z-Scores for *Escherichia coli* in beef

laboratory number		*Escherichia coli*			
		assigned value 3.77 log_{10}cfu/g			
		result, cfu/g	result, log_{10}cfu/g	z-score	MPN
031		12500	4.097	1.3	no
034		15977.25	4.204	1.7	yes
036		2.4E+4	4.380	**2.4**	yes
038		7.4E+3	3.869	0.4	no
040		4.5E+3	3.653	-0.5	no
041		1.2E+4	4.079	1.2	no
043		4.1E+3	3.613	-0.6	NO
044		7888	3.897	0.5	no
045		7.6E+3	3.881	0.4	NO
046		6.4E+3	3.806	0.1	no
048		2.6E+3	3.415	-1.4	no
055		6.5E+3	3.813	0.2	No
059		8455	3.927	0.6	No
062		2.5E+3	3.398	-1.5	no
063		3550	3.550	-0.9	no
064		6.9E+3	3.839	0.3	no
065		1.6E+3	3.204	**-2.3**	no
067		8.1E+3	3.908	0.5	yes
070		8000	3.903	0.5	no
074	*	2.6E+3	3.415	-1.4	no
075		6.2E+3	3.792	0.1	no
078		6.1E+3	3.785	0.0	yes
079		34	1.531	**-9.0**	Yes
080		6.8E+3	3.833	0.2	yes
083		5.5E+3	3.740	-0.1	NO

z-scores outside |z| >2 are shown in **bold,** see Section 5
* tested outside of the time frame recommended for analysis
MPN - most probable number technique used

NOT CONTROLLED WHEN PRINTED

Table 3 (continued): Results and z-Scores for *Escherichia coli* in beef

laboratory number	*Escherichia coli*			
		assigned value 3.77 log_{10}cfu/g		
	result, cfu/g	result, log_{10}cfu/g	z-score	MPN
085	4.0E+3	3.602	-0.7	pour
087	5.96E+3	3.775	0.0	no
088	2.4E+3	3.380	-1.6	no
091	1.0E+4	4.000	0.9	no
094	6250	3.796	0.1	NO
096				
106	6.1E+3	3.785	0.0	No
109	7.6E+3	3.881	0.4	yes
110	3.8E+3	3.580	-0.8	no
113	1.4E+3	3.146	**-2.5**	no
119				
120	3.9E+3	3.591	-0.7	No
123	9300	3.968	0.8	No
124	7.6E+2	2.881	**-3.6**	no
127	6.59E+3	3.819	0.2	no
131	7.6E+3	3.881	0.4	no
132	5.4E+3	3.732	-0.2	no
133	9.2E+3	3.964	0.8	no
134	2.2E+3	3.342	-1.7	NO
138	8.8E+3	3.944	0.7	no
146	3.7E+3	3.568	-0.8	no
147	5.6E+3	3.748	-0.1	yes
152	5.8E+3	3.763	0.0	NO
155	62.25E+2	3.794	0.1	No
156	5.5E+3	3.740	-0.1	no

z-scores outside |z| >2 are shown in **bold,** see Section 5
MPN - most probable number technique used

NOT CONTROLLED WHEN PRINTED

Table 3 (continued): Results and z-Scores for *Escherichia coli* in beef

laboratory number		*Escherichia coli*			
		assigned value 3.77 log_{10}cfu/g			
		result, cfu/g	result, log_{10}cfu/g	z-score	MPN
157		6.3E+3	3.799	0.1	No
158	*	9727	3.988	0.9	no
160		7.3E+3	3.863	0.4	NO
161		6.9E+3	3.839	0.3	yes
163		9.8E+3	3.991	0.9	No
167		2.2E+3	3.342	-1.7	no
168	*	6.7E+3	3.826	0.2	No
169		6.0E+3	3.778	0.0	NO
170		6.2E+3	3.792	0.1	no
172		9800	3.991	0.9	No
175		6.3E+3	3.799	0.1	yes
188		8.3E+3	3.919	0.6	yes
193		5600.00	3.748	-0.1	NO
196		6700	3.826	0.2	no
199		7.1E+3	3.851	0.3	no
200	*	4.5E+3	3.653	-0.5	yes
202		7.0E+3	3.845	0.3	Yes
203		1800	3.255	**-2.1**	no
204		6.0E+3	3.778	0.0	NO
205		3600	3.556	-0.9	no
206		5300	3.724	-0.2	no
209		4600	3.663	-0.4	Yes
210		6400	3.806	0.1	yes
212		8.2E+3	3.914	0.6	NO
216		7.6E+3	3.881	0.4	no

z-scores outside |z| >2 are shown in **bold,** see Section 5
* tested outside of the time frame recommended for analysis
MPN - most probable number technique used

NOT CONTROLLED WHEN PRINTED

Table 3 (continued): Results and z-Scores for *Escherichia coli* in beef

laboratory number		*Escherichia coli*			
		assigned value 3.77 log_{10}cfu/g			
		result, cfu/g	result, log_{10}cfu/g	z-score	MPN
217		4.15E+3	3.618	-0.6	Yes
218		2.3E+4	4.362	**2.4**	YES
228		1.5E+3	3.176	**-2.4**	no
231		8.1E+3	3.908	0.5	NO
233		2.4E+3	3.380	-1.6	no
234		3300	3.519	-1.0	no
235					
236		6.2E+3	3.792	0.1	no
241		9300	3.968	0.8	yes
243		5.0E+3	3.699	-0.3	no
246		4900	3.690	-0.3	No
247		5.4E+3	3.732	-0.2	no
248	*	2.3E+2	2.362	**-5.6**	YES
249	*	6000	3.778	0.0	no

z-scores outside |z| >2 are shown in **bold,** see Section 5
* tested outside of the time frame recommended for analysis
MPN - most probable number technique used

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Table 4: Results and z-Scores for aerobic plate count in chicken

laboratory number	aerobic plate count			
	assigned value 4.87 log_{10}cfu/g			
	result, cfu/g	result, log_{10}cfu/g	z-score	Method
004	7.5E+4	4.875	0.0	pour
008	6.5E+4	4.813	-0.2	Pour
012	8.5E+4	4.929	0.2	pour
013	8.0E+4	4.903	0.1	overlay
021	1.5E+5	5.176	1.2	pour
023	9.1E+4	4.959	0.4	pour
024	48000	4.681	-0.7	pour
025	7.9E+4	4.898	0.1	POUR
033	4E+4	4.602	-1.1	Pour
035	7.4E+4	4.869	0.0	pour
038	6.7E+4	4.826	-0.2	pour
041	7.8E+4	4.892	0.1	POUR
058	3.0E+4	4.477	-1.6	verteilen
063	65500	4.816	-0.2	pour
070	960	2.982	**-7.5**	Simplate total plate count color indicator
079	5.4E+4	4.732	-0.5	pour
080	7.9E+4	4.898	0.1	pour
085	125.0E+3	5.097	0.9	pour
089	7.4E+4	4.869	0.0	Pour Plate Method
093	7.7E+4	4.886	0.1	POUR
094	67500	4.829	-0.2	spread
095	75000	4.875	0.0	ok

z-scores outside |z| >2 are shown in **bold,** see Section 5
Method – comments as submitted by participants

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Table 4 (continued): Results and z-Scores for aerobic plate count in chicken

laboratory number	aerobic plate count			
	assigned value 4.87 log_{10}cfu/g			
	result, cfu/g	result, log_{10}cfu/g	z-score	Method
099	1.0E+5	5.000	0.5	pour
101	3.1E+4	4.491	-1.5	spread
105	7.8E+4	4.892	0.1	spread
108	6E+4	4.778	-0.4	Pour
113	8.1E+4	4.908	0.2	pour
117	8.7E+4	4.940	0.3	Pour
123	8800	3.944	**-3.7**	pour
129	9.1E+4	4.959	0.4	spread
134	5.3E+4	4.724	-0.6	Pour Plate
141	6.3E+4	4.799	-0.3	spread
142	1.1E+4	4.041	**-3.3**	pour
144	6.0E+4	4.778	-0.4	pour
145	5.7E+2	2.756	**-8.4**	overlay
147	8.2E+4	4.914	0.2	spread
149	7.2E+4	4.857	0.0	OVERLAY
152	9.2E+4	4.964	0.4	pour
153	7.3E+4	4.863	0.0	pour plate
155	55.42E+3	4.744	-0.5	Pour Plate
162	* 0E+0			pour
163	5.8E+4	4.763	-0.4	Pour
167	6.6E+4	4.820	-0.2	pour
170	5.5E+4	4.740	-0.5	pour

z-scores outside |z| >2 are shown in **bold,** see Section 5
* tested outside of the time frame recommended for analysis
Method – comments as submitted by participants

NOT CONTROLLED WHEN PRINTED

Table 4 (continued): Results and z-Scores for aerobic plate count in chicken

laboratory number		aerobic plate count			
		assigned value 4.87 log_{10}cfu/g			
		result, cfu/g	result, log_{10}cfu/g	z-score	Method
171		7.6E+2	2.881	**-7.9**	Petrifilm
172		79000	4.898	0.1	pour plate
180		7.1E+4	4.851	-0.1	Spread
183		72000	4.857	0.0	pour
184	*	1.2E+4	4.079	**-3.2**	pour plate
185		8.6E+4	4.934	0.3	Pour Plate
187	*	8.7E+4	4.940	0.3	spread
189		9.9E+4	4.996	0.5	pour
194		1.0E+5	5.000	0.5	pour
207	*	1.2E+4	4.079	**-3.2**	pour
208		7.2E+4	4.857	0.0	spread
210		89000	4.949	0.3	pour
215		1.0E+3	3.000	**-7.5**	spread
216		6.45E+4	4.810	-0.2	overlay
224	*	7.0E+4	4.845	-0.1	pour
228		2.9E+5	5.462	**2.4**	pour
237		5.7E+04	4.756	-0.4	drop
240		8.9E+4	4.949	0.3	spread
241		88000	4.944	0.3	pour
244	*	7.6E+4	4.881	0.1	pour

z-scores outside |z| >2 are shown in **bold,** see Section 5
* tested outside of the time frame recommended for analysis
Method – comments as submitted by participants

NOT CONTROLLED WHEN PRINTED

Table 5: Results and z-Scores for yeasts and moulds in flour

laboratory number	yeasts and moulds		
	assigned value 3.90 log_{10}cfu/g		
	result, cfu/g	result, log_{10}cfu/g	z-score
001	1.02E+4	4.009	0.4
010	2.1E+4	4.322	1.7
014	7.3E+3	3.863	-0.2
018	4.2E+4	4.623	**2.9**
019	7.5E+3	3.875	-0.1
020	9.0E+3	3.954	0.2
028	6.18	0.791	**-12.5**
029	9.22E+3	3.965	0.2
031	6.400	0.806	**-12.4**
032	1.45E+4	4.161	1.0
037	9.5E+3	3.978	0.3
039	6.6E+3	3.820	-0.3
042	7.1E+3	3.851	-0.2
053	7100	3.851	-0.2
055	1.2E+4	4.079	0.7
056	5650	3.752	-0.6
069	9650	3.985	0.3
070	9400	3.973	0.3
072	6.6E+3	3.820	-0.3
081	9.0E+3	3.954	0.2

z-scores outside |z| >2 are shown in **bold,** see Section 5

NOT CONTROLLED WHEN PRINTED

Table 5 (continued): Results and z-Scores for yeasts and moulds in flour

laboratory number		yeasts and moulds		
		assigned value 3.90 log_{10}cfu/g		
		result, cfu/g	result, log_{10}cfu/g	z-score
084	*	1.2E+4	4.079	0.7
085		5.0E+3	3.699	-0.8
087		4.96E+3	3.695	-0.8
095		838	2.923	**-3.9**
097		5.4E+3	3.732	-0.7
100		5.7E+3	3.756	-0.6
102		7.4E+3	3.869	-0.1
109		6.5E+3	3.813	-0.4
116		8000	3.903	0.0
127		4.8E+3	3.681	-0.9
129		7.9E+3	3.898	0.0
130	*	5.5E+3	3.740	-0.7
140		9.5E+3	3.978	0.3
143		7.2E+3	3.857	-0.2
153		1.5E+4	4.176	1.1
154	*	5900	3.771	-0.5
159		9.6E+3	3.982	0.3
162	*	1.08E+4	4.033	0.5
164		5500	3.740	-0.7
170		1.2E+4	4.079	0.7

z-scores outside |z| >2 are shown in **bold,** see Section 5
* tested outside of the time frame recommended for analysis

NOT CONTROLLED WHEN PRINTED

Table 5 (continued): Results and z-Scores for yeasts and moulds in flour

laboratory number		yeasts and moulds		
		assigned value 3.90 log_{10}cfu/g		
		result, cfu/g	result, log_{10}cfu/g	z-score
174		6700	3.826	-0.3
177		4100	3.613	-1.2
184	*	2.2E+4	4.342	1.8
186		9.9E+3	3.996	0.4
193		5100.00	3.708	-0.8
199		1.2E+4	4.079	0.7
205		6500	3.813	-0.4
211	*	8.2E+3	3.914	0.0
212		6.8E+3	3.833	-0.3
213	*	4700	3.672	-0.9
214		6.0E+3	3.778	-0.5
215		7.8E+3	3.892	0.0
218		8.0E+3	3.903	0.0
219		8.7E+3	3.940	0.1
220		8.1E+3	3.908	0.0
228		1.4E+4	4.146	1.0
229		9.7E+3	3.987	0.3
230		8.6E+3	3.934	0.1
242		31000	4.491	**2.3**
245	*	7.2E+3	3.857	-0.2

z-scores outside |z| >2 are shown in **bold,** see Section 5
* tested outside of the time frame recommended for analysis

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Table 6: Results and z-Scores for *Campylobacter* spp. in chicken

laboratory number		*Campylobacter* spp.			
		assigned value 3.55 log_{10}cfu/g			
		result, cfu/g	result, log_{10}cfu/g	z-score	semi-quantitative method
005		1.7E+3	3.230	-0.9	no
007		3.3E+3	3.519	-0.1	YES
016		1.32E+4	4.121	1.6	No
045		1.5E+3	3.176	-1.1	No
047		6300	3.799	0.7	no
049		1.7E+3	3.230	-0.9	no
058		0			no
061		2800	3.447	-0.3	yes
071		4900	3.690	0.4	NO
076		4.2E+3	3.623	0.2	no
088		3.4E+3	3.531	-0.1	no
090		4100	3.613	0.2	No
104		8.2E+3	3.914	1.0	no
107		1220	3.086	-1.3	no
112	*	4000	3.602	0.1	Yes
113		8.0E+2	2.903	-1.9	no
115		6.0E+3	3.778	0.6	no
123		3600	3.556	0.0	No
126		1.5E+3	3.176	-1.1	no
128		3.8E+3	3.580	0.1	no

* tested outside of the time frame recommended for analysis

NOT CONTROLLED WHEN PRINTED

Table 6 (continued): Results and z-Scores for *Campylobacter* spp. in chicken

laboratory number	*Campylobacter* spp.			
	assigned value 3.55 log_{10}cfu/g			
	result, cfu/g	result, log_{10}cfu/g	z-score	semi-quantitative method
133	7.7E+3	3.886	1.0	no
136	3268	3.514	-0.1	no
137	8909	3.950	1.1	NO
139	5.7E+3	3.756	0.6	no
150	120	2.079	**-4.2**	no
161	3.2E+3	3.505	-0.1	no
180	2.9E+3	3.462	-0.3	no
182	2.8E+3	3.447	-0.3	NO
195	1.1E+3	3.041	-1.5	no
198	1600	3.204	-1.0	no
201	7.5E+3	3.875	0.9	no
203	<10	0.000		yes
204				
210	770	2.886	-1.9	yes
222	1.3E+3	3.114	-1.2	NO
227	910	2.959	-1.7	NO
239	1.7E+5	5.230	**4.8**	yes

z-scores outside |z| >2 are shown in **bold,** see Section 5

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Table 7: Results and Assessments for *Listeria monocytogenes* and *Listeria* spp. in chicken

laboratory number		*L. monocytogenes*			*Listeria* spp.		
		test material A	test material B		test material A	test material B	
		intended result not detected	intended result detected		intended result not detected	intended result detected	
		result	result	assessment	result	result	assessment
003		not detected	detected	S	not detected	detected	S
038		not detected	detected	S			
050							
057		not detected	detected	S	not detected	detected	S
060					not detected	detected	S
066		not detected	detected	S	not detected	not detected	NS
068		not detected	detected	S	not detected	detected	S
069		not detected	detected	S			
082	*	not detected	detected	S			
097		not detected	detected	S	not detected	detected	S
098		not detected	detected	S	not detected	detected	S
103		not detected	detected	S	not detected	detected	S
114	*	not detected	detected	S			
118	*	not detected	detected	S			
127		not detected	detected	S			

S = satisfactory
NS = not satisfactory
* tested outside of the time frame recommended for analysis

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Table 7 (continued): Results and Assessments for *Listeria monocytogenes* and *Listeria* spp. in chicken

laboratory number		*L. monocytogenes*			*Listeria* spp.		
		test material A	test material B		test material A	test material B	
		intended result not detected	intended result detected		intended result not detected	intended result detected	
		result	result	assessment	result	result	assessment
136		not detected	detected	S	not detected	not detected	NS
145		not detected	detected	S	not detected	not detected	NS
151		not detected	detected	S	not detected	detected	S
167		not detected	detected	S		detected	
173		not detected	detected	S	not detected	detected	S
175		not detected	detected	S			
179		not detected	detected	S		detected	
188		not detected	detected	S	not detected	detected	S
218		not detected	detected	S	not detected	detected	S
221	*	not detected	detected	S	not detected	detected	S
225	*	not detected	detected	S	not detected	detected	S
226		not detected	detected	S	not detected	detected	S
228		not detected	detected	S	not detected	detected	S
237		not detected	detected	S			

S = satisfactory
NS = not satisfactory
* tested outside of the time frame recommended for analysis

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Table 8: Results and Assessments for *Salmonella* spp. in ground pepper

laboratory number		*Salmonella* spp.		
		test material A	test material B	
		intended result not detected	intended result detected	
		result	result	assessment
024		not detected	detected	S
073		not detected	detected	S
077		not detected	detected	S
080		not detected	detected	S
087		not detected	detected	S
111		not detected	detected	S
113		not detected	detected	S
121	*	detected	not detected	NS
122	*	detected	not detected	NS
125		not detected	detected	S
134		not detected	detected	S
140		not detected	detected	S
148		not detected	detected	S
164		not detected	detected	S
165	*	not detected	detected	S
172		not detected	detected	S
173		not detected	detected	S
176		detected	detected	NS
178		not detected	detected	S
187	*	not detected	not detected	NS
190		not detected	detected	S
192	*	not detected	detected	S
197		not detected	detected	S
223	*	not detected	detected	S
232	*	not detected	detected	S
238		not detected	not detected	NS

S = satisfactory
NS = not satisfactory
* tested outside of the time frame recommended for analysis

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Table 9: Results and Assessments for *E. coli* O157:H7 in sprouting seeds and lettuce

laboratory number	*E. coli* O157:H7		
	test material A	test material B	
	intended result not detected	intended result detected	
	result	result	assessment
051	not detected	detected	S
052	not detected	detected	S
054	not detected	detected	S
069	not detected	detected	S
080	not detected	detected	S
086	not detected	detected	S
087	not detected	detected	S
088	not detected	detected	S
089	not detected	detected	S
092	detected	not detected	NS
111	not detected	detected	S
135	detected	detected	NS
153	not detected	detected	S
166	not detected	detected	S
180	not detected	detected	S
181	* detected	not detected	NS
191	not detected	detected	S
215	not detected	detected	S

S = satisfactory
NS = not satisfactory
* tested outside of the time frame recommended for analysis

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Table 10: Assigned Values and Standard Deviations for Enumeration Tests

proficiency test	data points, n	assigned value, x_a, $\log_{10}$cfu/g	uncertainty, u	standard deviation for proficiency, σ_p, $\log_{10}$cfu/g
enumeration of enterobacteriaceae in beef	95	3.82	0.017	0.25
enumeration of coliforms in beef	94	3.81	0.020	0.25
enumeration of *Escherichia coli* in beef	108	3.77	0.019	0.25
aerobic plate count in chicken	63	4.87	0.014	0.25
enumeration of yeasts and moulds in flour	58	3.90	0.022	0.25
enumeration of *Campylobacter* spp. in chicken	34	3.55	0.094	0.35

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Table 11: Number and Percentage of z-Scores where |z| ≤2

proficiency test	number of scores where |z| ≤2	total number of scores	% |z| ≤2
enumeration of enterobacteriaceae in beef	91	95	96
enumeration of coliforms in beef	84	94	89
enumeration of *Escherichia coli* in beef	96	108	89
aerobic plate count in chicken	54	63	86
enumeration of yeasts and moulds in flour	55	60	92
enumeration of *Campylobacter* spp. in chicken	32	34	94

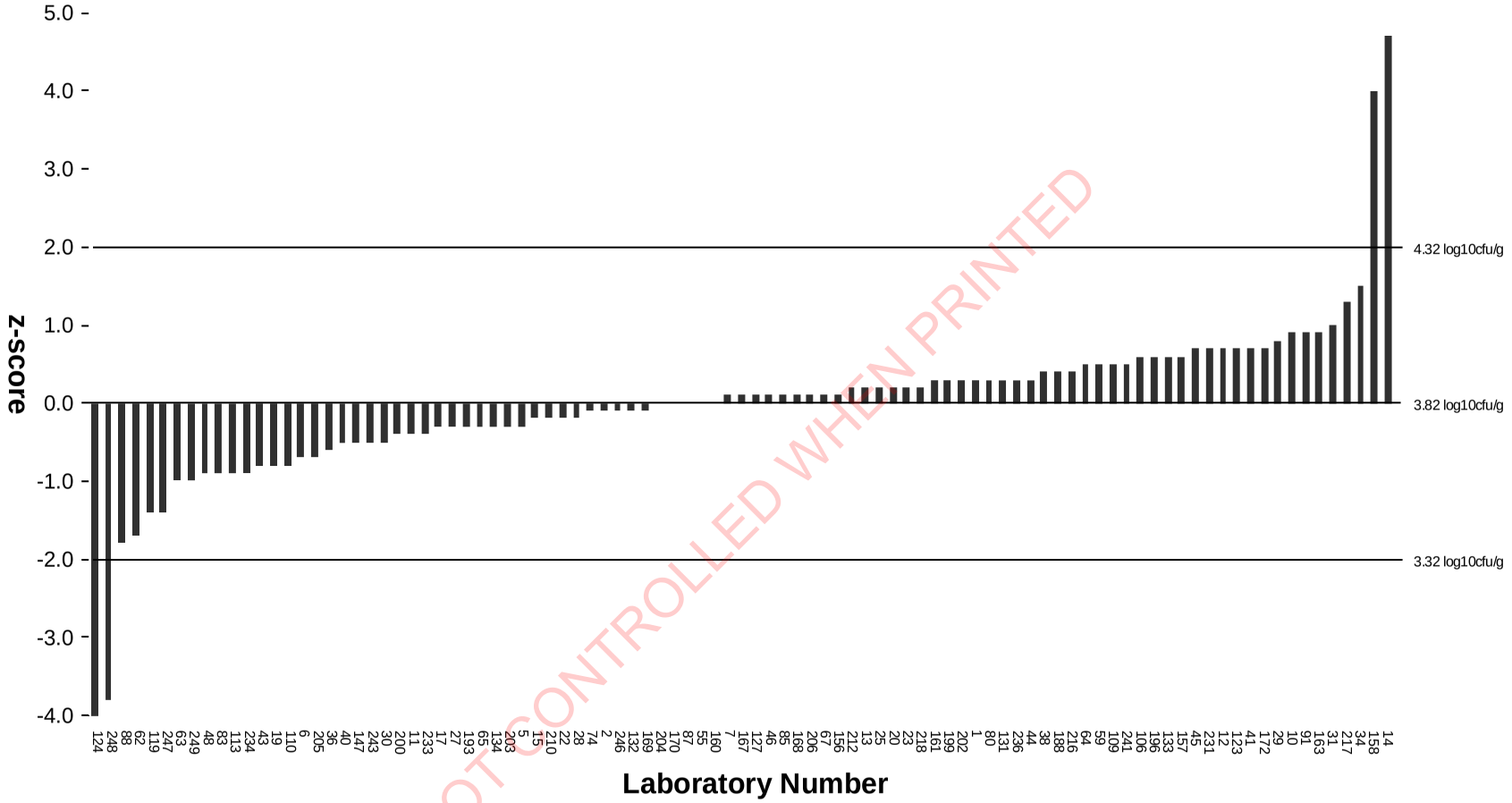
Table 12: Intended Results for Proficiency Tests in Detection

proficiency test	test material A	test material B
detection of *Listeria monocytogenes* in chicken	not detected	detected
detection of *Listeria* spp. in chicken	not detected	detected
detection of *Salmonella* spp. in ground pepper	not detected	detected
detection of *E. coli* O157:H7 in sprouting seeds and lettuce	not detected	detected

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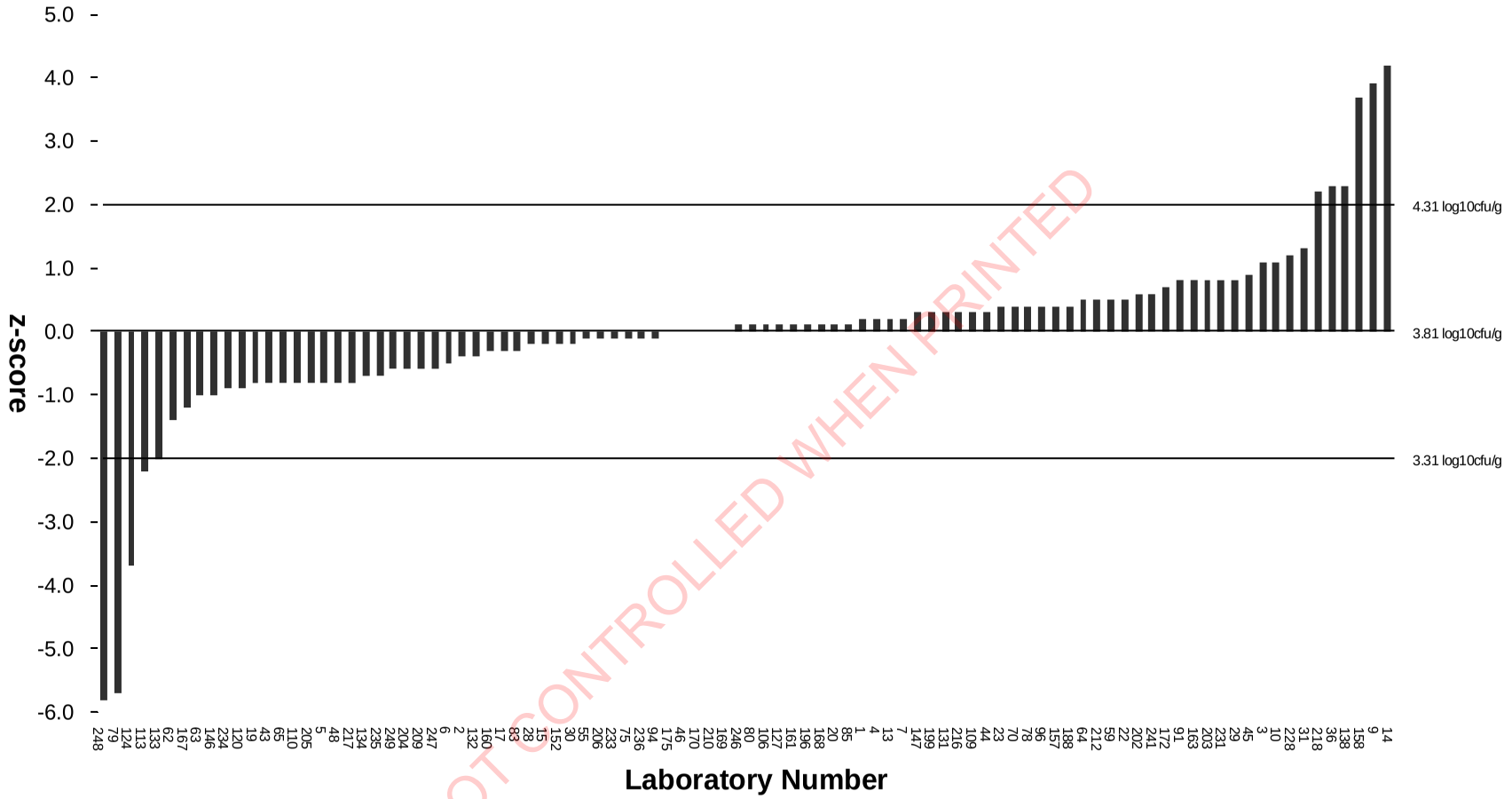
Table 13: Number and Percentage of Satisfactory Assessments and False Results for Proficiency Tests in Detection

proficiency test	number of satisfactory assessments	total number of assessments	satisfactory / agreement with intended result %	false negatives %	false positives %
detection of *Listeria monocytogenes* in chicken	27	27	100	0	0
detection of *Listeria* spp. in chicken	15	18	83	15	0
detection of *Salmonella* spp. in ground pepper	21	26	81	15	12
detection of *E. coli* O157:H7 in sprouting seeds and lettuce	15	18	83	11	17



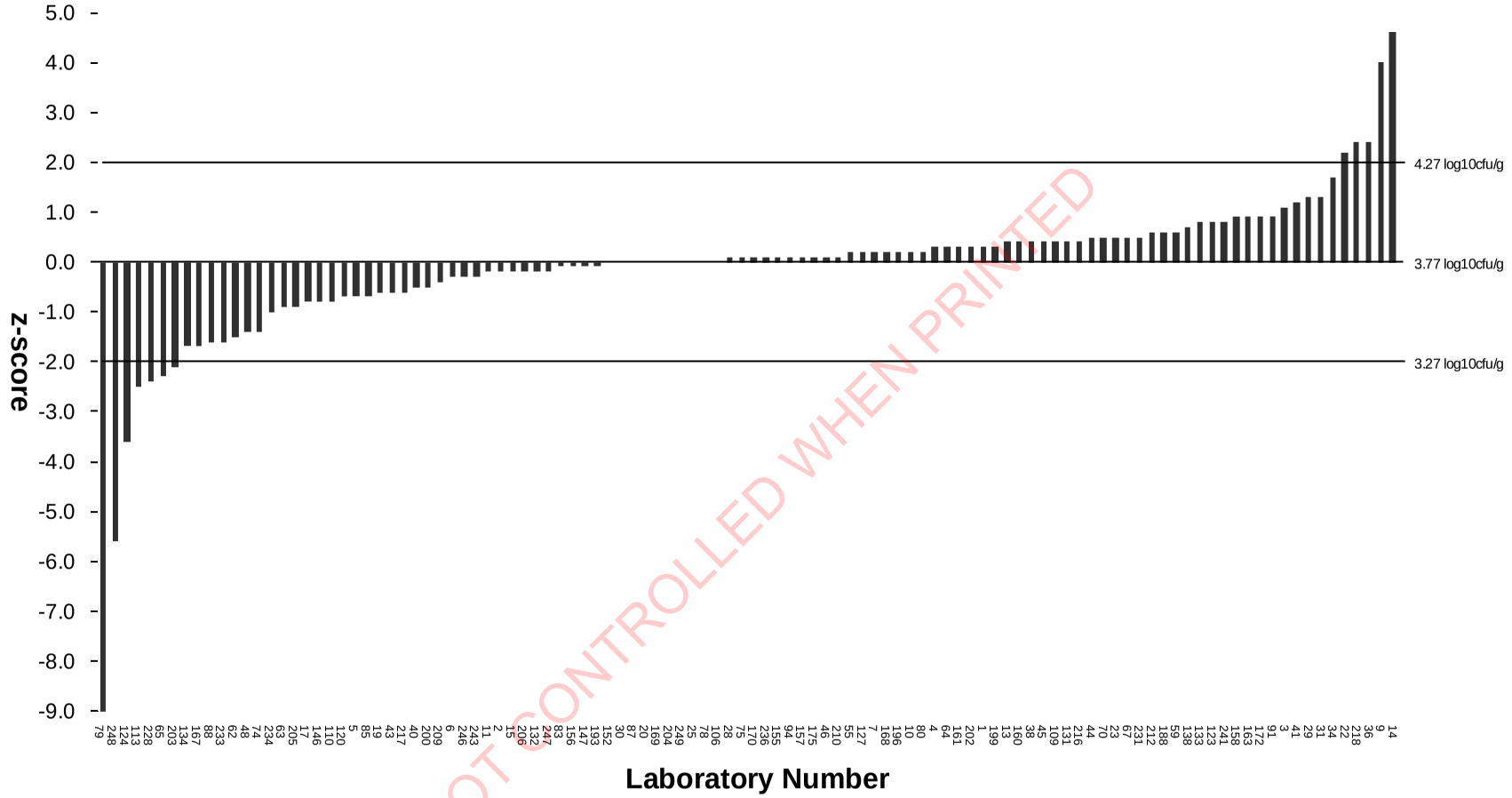
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Figure 1: z-Scores for enterobacteriaceae in beef



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Figure 2: z-Scores for coliforms in beef



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Figure 3: z-Scores for *Escherichia coli* in beef

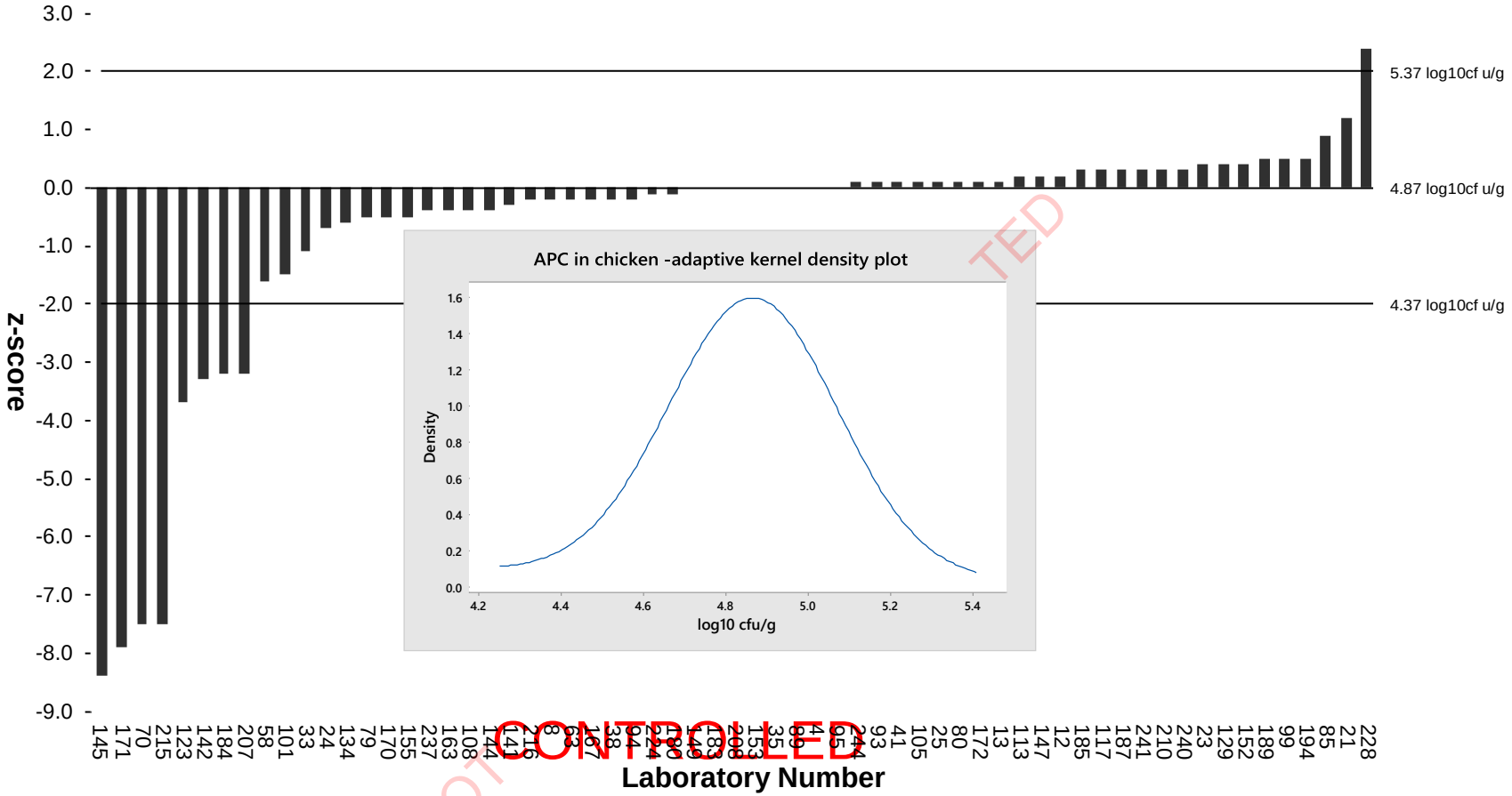
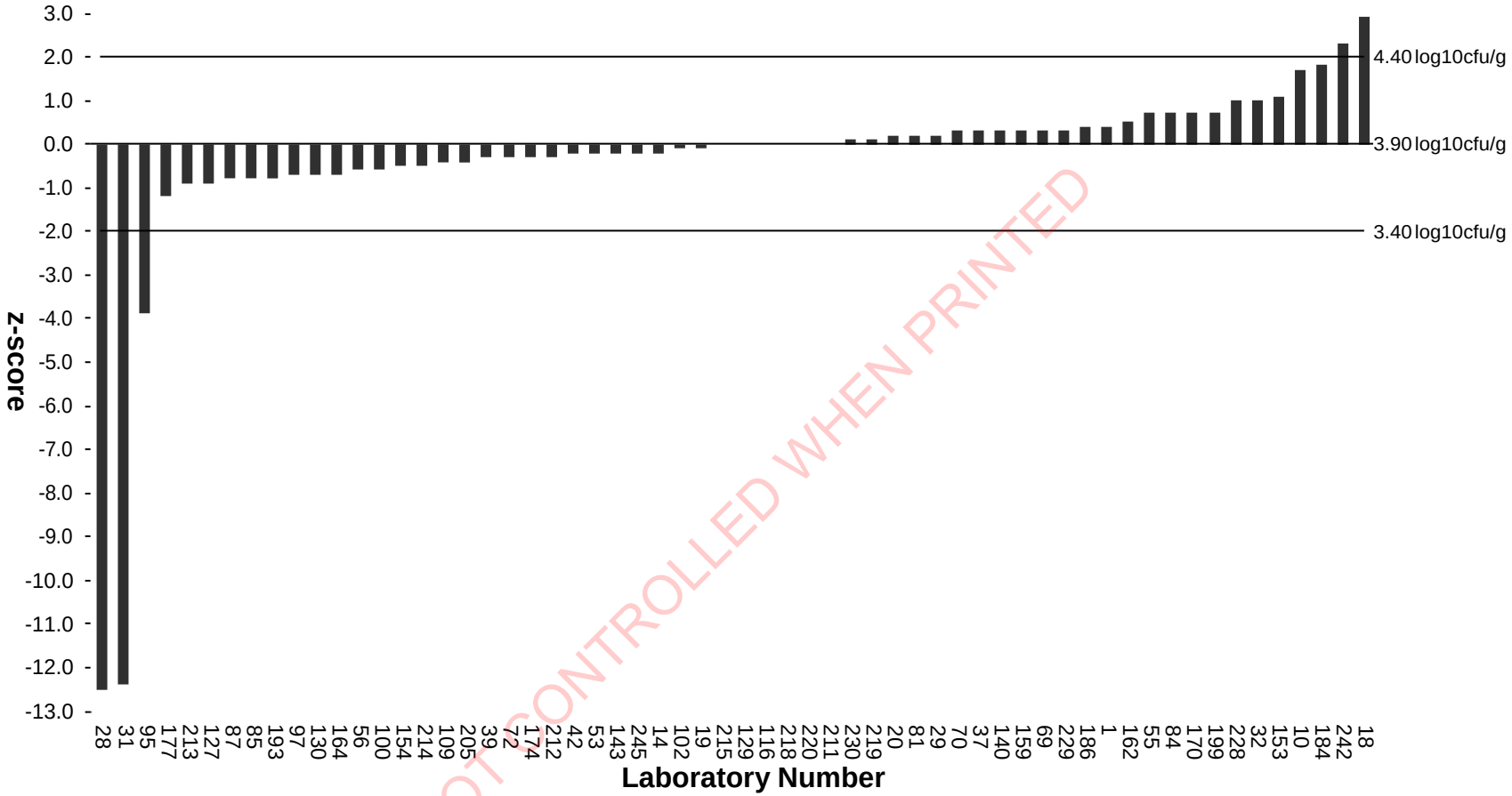


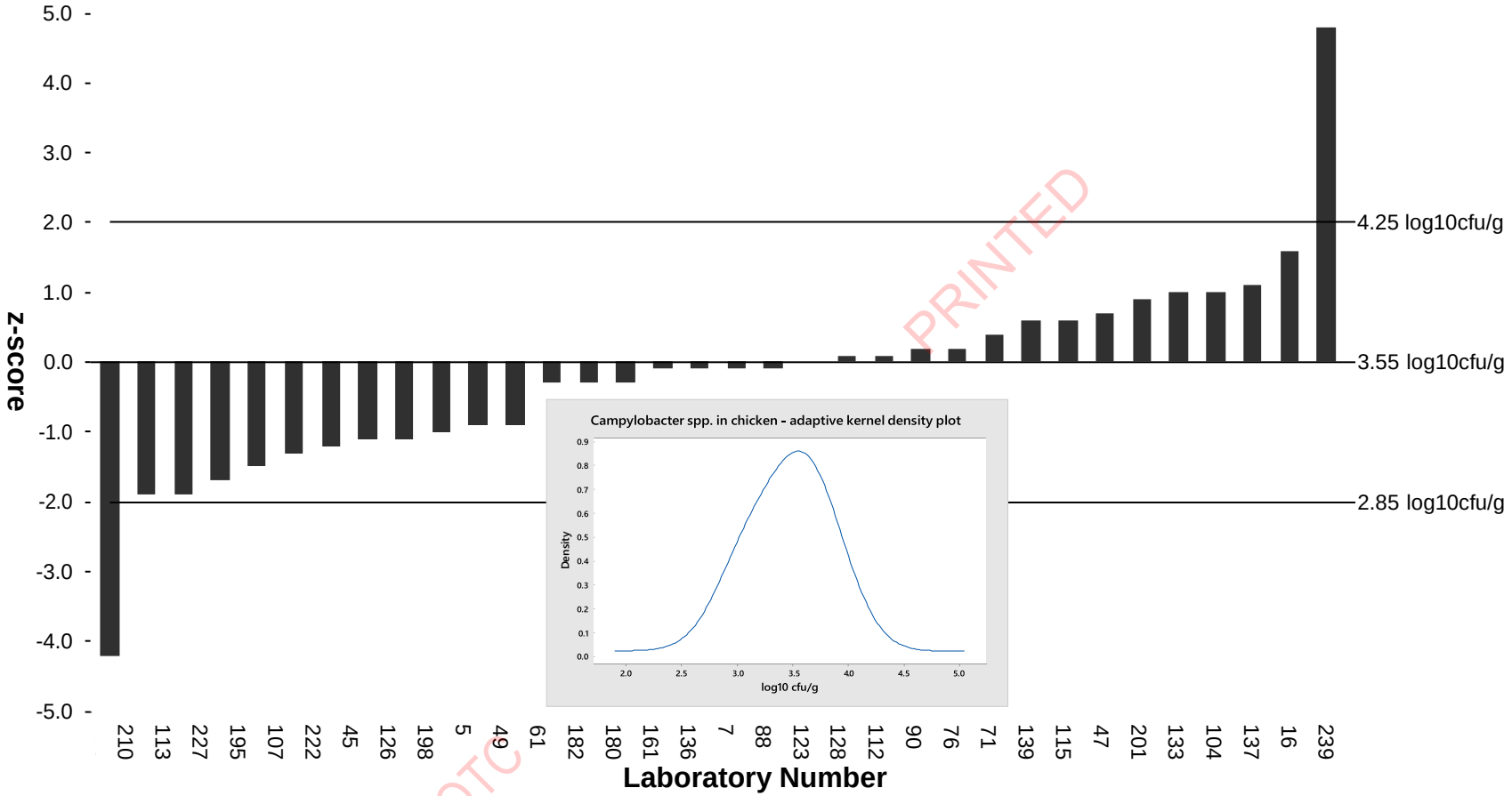
Figure 4: z-Scores for aerobic plate count in chicken

The insert presents the kernel density plot of the distribution of results.



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Figure 5: z-Scores for yeasts and moulds in flour



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Figure 6: z-Scores for *Campylobacter* spp. in chicken

The insert presents the kernel density plot of the distribution of results.

APPENDIX I: Organisms present in Fapas® – Food Microbiology Test Materials

proficiency test	matrix	target organism	background flora
enumeration of enterobacteriaceae/coliforms/*E. coli*	beef	*Escherichia coli*	*Kocuria rhizophila* *Staphylococcus aureus* *Bacillus cereus*
aerobic plate count	chicken	*Lactobacillus plantarum* *K. rhizophila* *S. aureus*	n/a
enumeration of yeasts and moulds	flour	*Penicillium brevicompactum*	*Bacillus subtilis*
enumeration of *Campylobacter* spp.	chicken	*Campylobacter jejuni*	*E. coli*
detection of *Listeria monocytogenes/Listeria spp.* test material A	chicken	none	*Proteus mirabilis* *B. cereus* *S. aureus*
detection of *Listeria monocytogenes/Listeria* spp. test material B	chicken	*Listeria monocytogenes*	*E. coli* *S. aureus* *B. cereus*
detection of *Salmonella* spp. test material A	ground pepper	*none*	*Bacillus coagulans* *Citrobacter freundii*
detection of *Salmonella* spp. test material B	ground pepper	*Salmonella* Cerro	*B. coagulans*
detection of *E. coli* O157:H7 test material A	sprouting seeds and lettuce	none	*E. coli* *B. coagulans* *Pseudomonas putida*
detection of *E. coli* O157:H7 test material B	sprouting seeds and lettuce	*E. coli* O157:H7	*B. coagulans* *P. putida*

n/a not applicable

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APPENDIX II: Verification of Positive Qualitative Test Materials

target organism	level of target organism, as assessed by the most probable number technique, MPN/g
Listeria monocytogenes	13 (4.4 to 37*) / 2.3 (0.76 to 7.0*)
Salmonella spp.	23 (7.6 to 70*) / 49 (15 to 160*)
Escherichia coli O157:H7	17 (6.3 to 45*) / 4.5 (1.5 to 14*)

*confidence limit at >95%

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APPENDIX III: Analytical Methods Used by Participants

Methods are tabulated according to the information supplied by participants, but some responses may have been combined or edited for clarity.

Enterobacteriaceae/coliforms/*E. coli* in beef

Accredited Method Used	laboratory number
no	002 003 004 005 011 022 025 028 067 083 123 146 233 241
yes	001 006 009 010 012 014 015 017 020 023 026 027 034 036 038 040 041 043 046 055 059 062 064 065 075 078 079 080 085 088 091 094 106 110 119 120 124 131 132 133 134 138 155 156 158 160 161 168 170 172 175 188 193 196 199 200 202 205 206 209 210 212 216 217 218 228 234 235 236 246 248 249

Method Based on an International Standard	laboratory number
no	004 028 036 040 041 046 067 080 083 235
yes	001 002 003 005 006 010 011 012 014 015 017 020 022 023 025 026 027 031 034 038 043 055 059 062 064 065 070 075 078 079 085 088 094 106 110 119 120 123 124 131 132 133 134 138 146 155 156 158 160 161 168 170 172 175 188 193 196 199 200 202 205 209 210 212 216 217 218 228 233 234 236 241 246 248 249

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Which International Standard	laboratory number
APC FDA/BAM Chapter 3	078 155
Campylobacter spp. detection FDA/BAM Chapter 7	241
Coliforms enumeration ISO 4832:2006	001 014 015 020 022 028 031 043 059 062 064 065 106 110 124 131 132 161 168 169 170 196 199 202 205 212 234 246
Coliforms enumeration AOAC 991.14	006 094 120 146 210
Enterobacteriaceae enumeration ISO 21528-2:2004	002 006 011 012 013 014 017 020 022 031 043 055 059 062 064 065 088 106 110 119 124 131 132 156 158 161 168 170 188 196 199 200 205 234 236 241 246
Escherichia coli enumeration ISO 16649-1:2001	006 031 217 248
Escherichia coli enumeration ISO 16649-2:2001	005 011 014 020 022 025 043 059 062 064 065 106 110 123 124 131 132 133 138 156 161 170 196 199 200 205 212 217 234 236 246
Escherichia coli enumeration AOAC 991.14	034 120 160 216
1.Enterobacteriaceae (ISO 21528-2,2017) 2.Coliform AOAC official Method 991.14 (2016) 3. E.coli AOAC official Method 998.08 (2016)	210
AFNOR Certificate No. 3M 01/06-09/97	027
AOAC 998.08	075
AOAC Official Method 966.24, Coliform Group and Escherichia coli, Microbiological (MPN) Method	026
AOAC-998.08	003
CCFRA	134
CCFRA 2.2.1: 2007 (for coliforms)	172
Chromo ID Coli agar	013
FDA/BAM chapter 4	228
FDA/BAM Chapter 4 Enumeration of Escherichia coli and Coliforms Bacteria	079
NMKL 96-03	209
Petrifilm Enterobacterias - CMMEF (APHA, 5a. Edicao, 2015). Petrifilm Coliformes - AOAC 991.14 Petrifilm E. coli - AOAC 998.08	249
US FDA BAM Chapter 4	085

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Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	001 002 003 004 006 010 011 013 015 017 022 023 026 031 034 036 038 040 055 059 065 070 079 080 085 091 119 120 123 124 131 133 134 138 146 156 169 170 172 188 193 199 205 209 210 212 216 217 228 234 235 236 246 249
Butterfield's Phosphate Buffer	005 027 075 078 088 175 206 241
Maximum Recovery Diluent (MRD)	020 025 046 064 106 132 161 168 196 202 248
Peptone Water	012 014 028 041 062 094 160
Phosphate Buffered Saline (PBS)	043 067 110 155 200
Ringer's Solution	083 218

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	003 006 010 011 014 055 065 079 091 120 134 170 193 206 216 248
Lauryl Tryptose Broth	026 078 202
Lauryl Sulphate Broth	036 209 217
1.Enterobacteriaceae Dilution fluid (DF) 2.Coliform Butter fluid phosphate buffer (BPD) 3. E.coli Butter fluid phosphate buffer (BPD)	210
3M Petrifilm	027
Ringers Salt Solution	228
Violet Red Bile(VRB)	094
VRBG Agar, VRBL Agar, TBX Agar	031
VRBG, VRBA, TBX	205

Which Secondary Enrichment Medium Used	laboratory number
Brilliant Green Bile Broth (BGBB)	218
Brilliant Green Bile Lactose Broth (BGLB)	078 079 209 217
BPW	006
EC Broth	026 079
NO use	094
Peptone water	014

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Plating Method Used	laboratory number
Pour plate	001 002 003 004 005 006 012 013 014 015 017 020 022 023 025 027 031 036 041 043 055 059 062 064 065 085 091 106 110 119 123 124 131 132 133 138 155 156 160 161 168 169 170 175 188 193 196 199 200 202 205 210 212 217 228 234 236 246 248
Spread plate	011 040 046 067 075 088 146 206 235 249
Overlay	094 134 172 209 216

Inoculum Volume (ml)	laboratory number
0.01	015
0.05	046
0.1	026 040 067 235
0.5	138
1.0	001 002 003 004 005 006 010 011 012 013 014 017 020 022 023 025 027 031 034 036 041 043 055 059 062 064 065 075 079 083 085 091 094 106 110 119 120 123 124 131 132 133 134 146 155 156 160 161 168 169 170 172 175 188 193 196 199 200 202 205 206 209 210 212 216 217 218 228 234 236 246 248 249

Alternative/Rapid Method	laboratory number
MOLDI-TOF	040 199
Most Probable Number - Tube	026 161 193 202
Most probable Number - Automated (e.g. TEMPO)	005 006 055 080 196 218
PCR	217
Petrifilm (3M)	002 003 011 015 027 041 075 079 083 094 120 131 146 155 160 175 188 206 216 249

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Incubation Temperature (°C)	laboratory number
30	036 040
35	003 015 026 034 075 078 079 080 085 094 120 146 155 160 175 196 206 216 217 241 249
37	001 002 005 006 011 012 013 014 017 020 022 027 031 046 055 067 070 083 088 091 106 110 119 123 131 132 134 138 161 168 169 170 172 188 193 199 202 205 209 210 212 218 228 234 235 236 246 248
42	041
44	025 064 133
45	200

Time Incubated (hours) Approximately	laboratory number
18	005 228
24	001 002 003 004 006 011 012 013 014 015 017 020 022 023 025 026 027 031 034 041 043 046 055 064 065 067 075 080 088 091 106 110 119 120 123 131 132 133 134 138 146 155 160 161 168 169 170 172 175 188 193 196 200 205 210 212 217 234 235 236 246 249
36	070
48	036 040 078 079 083 085 094 199 202 206 209 216 218 241 248

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Confirmation of Organism's Identity	laboratory number
API 20E	023 134 172 193 241 246
beta-Galactosidase	005 131
beta-glucoronidase activity	005 006 011 013 094 131 161
Catalase reaction	160
Enterotube (BBL)	091 110
Fermentation of Carbohydrates	013 014 017 040 043 123 156 161 168 172 199 228
IMViC test	106 160 168
Indole production	013 015 026 079 106 131 168 209 218 248
Morphology	005 146 169 228 236
Microscopy	160 228
Microbact 12A	168
Microbact 12E	106
Oxidase reaction	014 022 040 043 088 091 110 123 131 133 156 160 161 168 169 199 200 210 212 235
PCR	217
VITEK	038 132 160 196 202
Voges-Proskauer (VP) reaction	160

Enterobacteriaceae

Selective/Chromogenic Medium Used	laboratory number
Petrifilm (3M) Enterobacteriaceae	002 015 034 041 083 131 160 206 216 249
Violet Red Bile Agar (VRB)	085
Violet Red Bile Dextrose Agar (VRBD)	020 031 038 040 065 067 131 170 199 236
Violet Red Bile Glucose Agar (VRBG)	001 011 012 014 017 022 023 025 028 043 046 055 059 062 064 074 088 091 106 110 113 119 123 124 132 133 134 156 158 161 168 172 188 193 196 200 202 204 212 217 218 234 246 248
TEMPO EB culture medium	005

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Coliforms

Selective/Chromogenic Medium Used	laboratory number
Brilliant Green Bile Broth (BGBB)	078 168 172 228 248
Brilliant Green Bile Lactose Broth (BGLB)	014 026 065 079 110 196 204 209
Chromocult Coliform Agar	067 133 188
Endo Agar	235
Petrifilm (3M) Colliforms	001 002 003 017 034 083 094 120 146 206 216 249
Violet Red Bile Agar (VRB)	004 015 020 022 055 059 065 085 132 134 152 161 169 170 172 196 202 228 234
Violet Red Bile Glucose Agar (VRBG)	160 212
Violet Red Bile Lactose Agar (VRBL)	014 023 028 031 043 062 064 106 110 124 158 168 199 236 246
Coli ID	113
L-EMBA	217
MacCONKEY Broth	218
Petrifilm (3M) E.coli/Coliforms count plate	075
Rapid E.coli	131
TEMPO TC culture medium and RAPID'E.coli 2 agar medium	005

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Escherichia coli

Selective/Chromogenic Medium Used	laboratory number
Brilliance E.coli	006
Lauryl Sulphate Broth	168 202
Petrifilm (3M) Colliforms	002 003 015 034 083 094 120 146 155 216
Tryptone Bile Glucuronide Agar (TBX)	004 014 017 020 022 025 028 031 038 043 046 055 062 064 065 074 091 106 110 113 123 124 132 133 134 152 156 158 161 170 172 193 196 199 200 204 212 234 236 246
Tryptone Water	026 218 248
Eosine Methylene Blue Agar (EMB)	079 085 188 217
3M Petrifilm Select E.coli Count Plates	011
ChromID coli	088
Coli ID	023 059
Coli ID Agar / 3M PF Coliform&E.Coli	001
EC Broth	209
EC broth with MUg	078
GELOSE CROM ID COLI	169
MUG Violet Red Bile Agar	228
Petrifilm (3M) E.coli/Coliforms count plate	075
Petrifilm (3M) SEC, Rapid E.coli	131
Petrifilm 3M (E coli)	249
Petrifilm E.coli	040
Petrifilm E.coli (3M)	160
Simplate coliform and E.coli Color indicator	070
TEMPO EC culture medium and RAPID'E.coli 2 agar medium	005

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APC in chicken

Accredited Method Used	laboratory number
no	004 025 105 123 149 184 185 241 244
yes	008 012 013 021 023 033 038 041 058 079 080 089 093 099 101 108 117 129 134 141 142 145 153 155 163 170 171 180 183 187 189 194 207 208 210 216 224 228 237

Method Based on an International Standard	laboratory number
no	004 041 142 171 187 194 207 224
yes	008 012 013 021 023 025 033 035 038 058 070 079 080 089 093 099 101 108 117 123 129 134 141 145 149 153 155 163 170 180 183 184 185 189 208 210 216 228 237 241 244

Which International Standard	laboratory number
APC (pour plate) ISO 4833-1:2013	012 013 021 023 025 080 089 099 108 123 153 163 170 183 185 189 210 244
APC (spread plate) ISO 4833-1:2013	058 141
APC FDA/BAM Chapter 3	008 033 035 079 093 117 155 228 241
APC AOAC 990.12	101 208 216
10444.15-94	142
3M petrifilm	149
AOAC Official Method 2002.07 Detection and Quantification of Total Aerobic Microorganisms	184
AOAC Official Method 990.12(2000) 3M Petrifilm Aerobic Count Plates	145
APC CMMEF Chapter 7 (2001)	180
CCFRA 1.1.1	134
Enumeration of toal aerobic bacteria in food products using 3M petrifilm aerobic count plates	129

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	004 008 013 023 033 035 038 070 079 080 089 099 101 105 108 117 123 129 134 149 153 163 170 180 183 184 185 187 189 208 210 216 224 228 237
Butterfield's Phosphate Buffer	145 241
Maximum Recovery Diluent (MRD)	021 025 058 244
Peptone Water	012 041 142 171 207
Phosphate Buffered Saline (PBS)	141 155
Ringer's Solution	093 194

NOT CONTROLLED WHEN PRINTED

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	008 033 070 079 099 101 129 134 149 163 170 187 189 207 208 216 244
Tryptone Soya Broth	105
Dilution fluid (DF)	210
meat peptone agar	142
Peptone Salt Solution	185
Phosphate Buffer Saline	155
Plate Count Agar	194
Ringers Salt solution	228

Plating Method Used	laboratory number
Pour plate	004 008 012 021 023 025 033 035 038 041 079 080 089 093 099 105 108 117 123 134 142 153 155 163 170 183 184 185 189 194 207 210 224 228 241 244
Spread plate	101 129 180 187 208 237
Overlay	013 141 145 149 216

Inoculum Volume (ml)	laboratory number
0.1	105 141 180 237
1.0	004 008 012 013 021 023 025 033 035 038 041 079 080 089 093 099 101 108 117 123 129 134 142 145 149 153 155 163 170 171 183 184 185 187 189 194 207 208 210 216 224 228 241 244

Alternative/Rapid Method	laboratory number
Most probable Number - Automated (e.g. TEMPO)	033
Petrifilm (3M)	041 129 145 149 171 208 210 216 224

NOT CONTROLLED WHEN PRINTED

Incubation Temperature (°C)	laboratory number
30	004 012 013 021 023 025 038 041 058 080 089 099 105 123 129 141 142 149 153 163 170 183 185 187 189 194 207 210 224 237
35	008 033 035 070 079 093 101 145 155 171 180 184 216 241
37	108 117 134 208 228 244

Time Incubated (hours) Approximately	laboratory number
24	101 149 171 184
36	058 070
48	004 008 021 033 035 041 079 093 108 117 134 141 145 155 180 185 194 208 216 228 241 244
60	013 025 038 080 089 099 105 129 142 153 163 170 187 189 207 210 237

Confirmation of Organism's Identity	laboratory number
Morphology	149
Microscopy	189

Which Selective/Chromogenic Medium Used (APC)	laboratory number
Petrifilm (3M) Aerobic Plate Count	041 094 101 129 145 171 208 216
Plate Count Agar (PCA)	004 008 012 013 021 023 025 033 035 038 058 079 080 093 099 105 108 113 123 134 141 142 152 153 163 170 180 183 185 189 194 207 210 228 237 244
Simplate total plate count color indicator	070

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Yeasts and moulds in flour

Accredited Method Used	laboratory number
no	018 028 031 032 084 100 153 184 186 213 218 228
yes	010 014 020 053 055 072 081 085 097 102 116 129 130 140 143 154 162 164 170 174 177 193 199 205 211 212 214 219 220 229 230 242 245

Method Based on an International Standard	laboratory number
no	028 032 053 072 129 214 219 229 245
yes	010 014 018 020 031 055 070 081 084 085 097 100 102 116 130 140 143 153 154 162 164 170 174 177 184 186 193 199 205 211 212 213 218 220 228 230 242

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Which International Standard	laboratory number
APC AOAC 990.12	186
Yeasts and Moulds (sum) enumeration (high water availability) ISO 21527-1:2008	055 081
Yeasts and Moulds (sum) enumeration (low water availability) ISO 21527-2:2008	014 020 031 084 100 102 129 130 140 143 153 170 193 199 205 212
AOAC Official Method 997.02	242
AOAC Official Method 997.02 Yeast and Molds Count in Foods	213
Bacteriological Analytical Manual Chapter 18 Yeasts, Molds and Mycotoxins	164
BAM	211
BAM Chapter 18, 2001	116
BAM, Ch 18, Yeast, Molds and Micotoxins, Enumeration of Yeasts and Molds in Food-Dilution Plating Technique	174
FDA/BAM Chapter 18	228
GB 4789.15-2016	219 229
ISO 01.00-37	230
ISO 6611:2004 (Second edition)	218
National Standard of Indonesia number 3746:2008	072
NF V08-059	053
US FDA BAM Chapter 18	085
Yeast and Mold AOAC 997.02	097
Yeast and Mold Counts in Foods:AOAC Official Method 997.02	018

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	010 018 031 055 072 085 102 129 130 153 162 174 184 193 199 205 211 213 245
Butterfield's Phosphate Buffer	070 097 228
Maximum Recovery Diluent (MRD)	020 032 081 084 143 170 186 214
Peptone Water	014 100 116 154 164 177 219 220 242
Phosphate Buffered Saline (PBS)	212
Ringer's Solution	218
Tryptone Water	053 140

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Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	018 031 055 072 100 102 129 162 174 186 193 199 213
1% peptone water	228
Agar S ISO 21572-2	205
Bacteriological Peptone	164
Maximum recovery dilluent	143
Peptone water	014

Which Secondary Enrichment Medium Used	laboratory number
Fraser Broth	186
DG18	130 143
not applicable	213

Plating Method Used	laboratory number
Pour plate	018 031 053 072 116 140 162 174 177 184 186 205 219 220 229 242 245
Spread plate	014 020 032 055 081 084 085 100 102 129 130 143 153 164 170 193 199 211 212 214 218 228 230

Inoculum Volume (ml)	laboratory number
0.01	031
0.1	014 020 032 055 081 084 100 129 130 143 153 164 193 199 205 211 212 218 228 230
0.5	102
1.0	010 018 053 072 085 097 116 140 154 162 170 174 184 186 213 214 219 220 229 242 245

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Alternative/Rapid Method	laboratory number
Compact dry	214
Impedance	162
Most probable Number - Automated (e.g. TEMPO)	055
PCR	186
Petrifilm (3M)	154 174 213 218 242

Incubation Temperature (°C)	laboratory number
22	070 140 177 242
25	010 014 018 020 031 032 053 055 072 081 084 085 097 100 102 116 129 130 143 153 154 164 170 174 184 186 193 199 205 211 212 214 218 219 220 228 229 230 245
30	162 213

Time Incubated (hours) Approximately	laboratory number
60	014 018 020 055 070 084 100 102 129 153 154 162 164 170 186 193 199 205 212 213 214 218 220 229 242

Confirmation of Organism's Identity	laboratory number
Morphology	177 184 211 228
Microscopy	053 164 174 218 228
PCR	162

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Selective/Chromogenic Medium Used	laboratory number
Dichloran 18% Glycerol Agar (DG18)	014 020 102 116 129 130 153 170 193 199 211 212 220 228
Dichloran Rose-Bengal Chloramphenicol Agar (DRBC)	055 081 085 164 193 211 229
Petrifilm (3M) Yeasts & Moulds	018 097 154 213 242
Potato Dextrose Agar (PDA)	056 072 174 177
Yeast Glucose Chloramphenicol Agar (YGC)	001 028 039 053 186 230 245
Biocontrol SimPlate Yeast & Mold	184
OGYE Agar	031
OXYTETRACYCLINE-GLUCOSE-YEAST EXTRACT AGAR (OGYE AGAR)	218
RBC	219

Campylobacter spp. in chicken

Accredited Method Used	laboratory number
no	005 007 045 058 061 115 123 126 133 139 150 161 180 198 227
yes	016 047 071 088 090 104 112 128 136 137 182 195 201 239

Method Based on an International Standard	laboratory number
no	071 088 128 180 227
yes	005 007 016 045 047 058 061 090 104 112 115 123 126 133 136 137 139 150 161 182 195 198 201 239

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Which International Standard	laboratory number
APC (spread plate) ISO 4833-1:2013	058
Campylobacter spp. detection ISO 10272-1:2006	005 007 061 150 201 239
Campylobacter spp. detection FDA/BAM Chapter 7	180
BS EN ISO 10272-2: 2017	090
BS EN ISO 10272-2:2017	112
EN ISO 10272-2 2017	016
ISO 10272-2	045
ISO 10272-2 2017	137
ISO 10272-2:2017	104
ISO 10272-2:2017Microbiology of the food chain -- Horizontal method for detection and enumeration of Campylobacter spp. -- Part 2: Colony-count technique	133
ISO10272-2	198
ISO10272-2:2017	126
MICROVAL 2009LR28	071

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	005 007 016 045 047 058 061 071 088 090 112 123 126 128 133 136 137 139 150 180 182 198 227 239
Maximum Recovery Diluent (MRD)	161
Peptone Water	201
Phosphate Buffered Saline (PBS)	115

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	071 112 133 139 227
BOLTON	007
CFB Campylobacter Food Broth (BiomÃ©rieux)	150
mCCDA	126
MRD for serial diution	047
no enrichment	201
Not use Primary Enrichment	198

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Which Secondary Enrichment Medium Used	laboratory number
Bolton Broth	007
CFB Campylobacter Food Broth (BiomÃ©rieux)	150
no enrichment	201

Plating Method Used	laboratory number
Pour plate	016 058 150 195 227 239
Spread plate	005 045 047 061 071 088 090 112 115 123 126 128 133 137 139 161 180 182 198 201
Overlay	007

Inoculum Volume (ml)	laboratory number
0.1	007 016 045 047 058 061 071 090 123 137 139 180 195 201 239
0.5	112
1.0	005 088 115 126 128 133 136 150 161 182 198 227

Alternative/Rapid Method	laboratory number
RapidChek	061

Incubation Temperature (°C)	laboratory number
41.5	016 045 047 061 071 088 090 112 115 123 126 128 133 136 137 139 150 161 182 195 198 227
42	005 007 058 180 239
44	201

Time Incubated (hours) Approximately	laboratory number
48	005 007 016 045 047 058 061 071 088 090 112 115 123 126 128 133 136 137 139 150 161 180 182 195 198 227 239
60	201

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Confirmation of Organism's Identity	laboratory number
API Campy	005 136 180
Catalase reaction	047 090
Haemolysis	239
Latex slide agglutination	007 088 112 198
Morphology	005 045 115 137 139 161
Microscopy	005 045
Motility	045 115 137 161
Oxidase reaction	045 058 115 123 126 128 133 137 150 161
Serological agglutination test	061 201

Selective/Chromogenic Medium Used	laboratory number
Campyfood Agar	016 071 227
Campylosel	113
Campylobacter selective blood free agar (CCDA)	137 139 180
Modified Campylobacter selective blood free agar (mCCDA)	005 016 047 058 104 112 115 126 133 161 182 195 198 239
Karmali Agar	201
AGAR CASAâ„¢	128
CASA	088
Rapid Campylobacter	180
Rapid Campylobacter agar	061

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L. monocytogenes/ *Listeria* spp. in chicken

Accredited Method Used	laboratory number
no	003 082 098 114 145 167 218
yes	038 057 060 066 097 136 151 179 188 221 225 226 228 237

Method Based on an International Standard	laboratory number
no	060 218 226 237
yes	003 038 057 066 082 097 098 114 136 145 151 167 179 188 221 225 228

Which International Standard	laboratory number
Listeria monocytogenes detection ISO 11290- 1:1996	098 188
Listeria monocytogenes detection ISO 11290- 1:1996/Amd 1:2004	151 221
Listeria monocytogenes enumeration ISO 11290-2:1998	038
AOAC	218
AOAC & FDA/BAM	057
AOAC-061506	003
Assurance EIA Listeria Single-Step Enrichment Protocol. AOAC Performance Tested Method 060802	145
DIN EN ISO 11290-1:2017-09	066
FDA/BAM chapter10	228
German ASU L03.00-40 (2013-08)	114
ISO 11290-1:2017 Listeria monocytogenes (Detection)	097

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	060 097 098 136 145 151 167 179 188 218 225 226 228 237
Half Fraser Broth	038 066 082 221

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Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	167
Fraser Broth	038 066
Half Fraser Broth	097 098 114 136 151 188 221 225 237
Buffered listeria enrichment broth (BLEB)	228
Less Plus Medium	003
Listeria Fraser Broth Base Half Concentration	145
LMX broth	218
RapidChek Listeria Media	057
UVM	179
UVM broth	226

Which Secondary Enrichment Medium Used	laboratory number
Brilliant Green Bile Lactose Broth (BGLB)	114
Fraser Broth	097 098 136 151 179 188 221 225 226

Plating Method Used	laboratory number
Pour plate	136
Spread plate	066 082 098 151 188 218 225 226

Inoculum Volume (ml)	laboratory number
0.001	151 218
0.01	066 098 226 228
0.1	082 136 188 225

Alternative/Rapid Method	laboratory number
Enzyme Immunoassay	145
MOLDI-TOF	038
PCR	114
RapidChek	057
VIDAS (ELFA)	098
miniVIDAS (ELFA)	082 218 221

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Incubation Temperature (°C)	laboratory number
30	038 057 060 114 145 179 221 225 226 237
35	188 228
37	066 082 097 098 136 151 218

Time Incubated (hours) Approximately	laboratory number
24	003 038 060 082 098 114 179 218 221 225 226 237
48	057 066 097 136 145 151 188 228

Confirmation of Organism's Identity	laboratory number
Aesculin hydrolysis	066 228
API Listeria	082 097 098 136 218 221 226
CAMP test	151 179 225
Catalase reaction	057 151 226
Fermentation of Carbohydrates	066 151 228
Haemolysis	066 151 237
Morphology	228
Microscopy	066 151
Motility	151 228
Nitrate/nitrite reduction	226
Oxidase reaction	226
PCR	114
VITEK	038 218
Voges-Proskauer (VP) reaction	226
Microbact 12L	145

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Salmonella spp. in ground pepper

Accredited Method Used	laboratory number
no	140 232
yes	073 080 121 122 125 134 164 165 172 173 176 178 187 192 197 223

Method Based on an International Standard	laboratory number
no	080 140 178
yes	073 121 122 125 134 164 165 172 173 176 187 192 197 223 232

Which International Standard	laboratory number
Salmonella spp. detection ISO 6579:2002/Amd 1:2007	173 187
Salmonella spp. detection FDA/BAM Chapter 5	134 164 192
AOAC 2009.03 & FDA/BAM Chapter 5	232
AOAC 2011.03 (VIDAS SLM METHOD)	073
AOAC Official Method, 2013.01, 20 th Edn, 2016	223
CCFRA 3.1.2:2007 and 3.1.5:2007	172
DIN EN ISO 6579-1:2017-07	125
IS 5887(Part 3):1999 RA 2018	178
ISO 6579-1:2017	176
SALMONELLA AOAC 2013:01 CHAPTER 17 (VIDAS METHOD) AND SALMONELLA spp.detection FDA /BAM Chapter 5	197

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	073 125 134 165 173 176 178 192 197 223 232

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	073 080 125 134 140 172 187 192 197
Half Fraser Broth	173
Mueller Kauffman Tetrathionate Novobiocin Broth (MKKTn)	176
Rappaport Vassiliadis Broth (RV)	121 122 176 178
Tryptone Soya Broth	164 232
Not applicable	165
SX2 broth	223

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Which Secondary Enrichment Medium Used	laboratory number
Fraser Broth	173
Rappaport Vassiliadis Broth (RV)	121 122 125 134 164 178 192 232
Rappaport Vassiliadis Soya Peptone(RVS)	172 187
Selenite Cysteine Broth	134 187
Tetrathionate Broth	125 134 164 172
fluid selenite cysteine broth	178
Rappaport Vassiliadis Broth (RV) and Tetrathionate Broth	197
Salmonella Xpress Broth(SX2)	073
SX2	080

Plating Method Used	laboratory number
Pour plate	187
Spread plate	125 164 173 192 197 223 232

Inoculum Volume (ml)	laboratory number
0.01	178 187 232
0.1	134 173 192 223
1.0	164

Alternative/Rapid Method	laboratory number
PCR	080 125 140 232
Reveal	121 122
VIDAS (ELFA)	073 164 165 187 192 197 223

Incubation Temperature (°C)	laboratory number
35	073 134 164 232
37	125 140 172 173 178 187 223
41.5	080 165 192
42	121 122 197

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Time Incubated (hours) Approximately	laboratory number
18	121 122
24	073 080 125 134 140 165 172 173 178 192 197 223 232
48	164 187

Confirmation of Organism's Identity	laboratory number
API 20E	080 125 134 172
beta-Galactosidase	178
Indole production	178
Lysine Decarboxylase	178
Morphology	187
Microscopy	187
Oxidase reaction	080
Serological agglutination test	080 178
PCR	232
VITEK	073 165 192 197
Voges-Proskauer (VP) reaction	178
Triple Sugar Iron Agar (TSI)	164 178 187 223

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E. coli O157:H7 in sprouting seeds and lettuce

Accredited Method Used	laboratory number
no	153 166
yes	051 052 054 080 086 088 092 111 135 180 191

Method Based on an International Standard	laboratory number
no	080
yes	052 054 086 088 092 135 153 166 180 191

Which International Standard	laboratory number
Escherichia coli O157:H7 detection ISO 16654:2001	086 088 092 153 166
Escherichia coli O157:H7 detection ISO/TS 13136:2012 (PCR)	052
ASU L 00.00-92	135
Escherichia coli O157:H7 detection AOAC 2000.14 (2000)	180

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	052 054 086 111 180 191

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	052 054 080 086
Tryptone Soya Broth	088 092
MAC Conkey Bouillon	135
modified Tryptone soya broth with Novobiocin	153
Reveal Broth	180

Plating Method Used	laboratory number
Pour plate	086
Spread plate	092 153

Inoculum Volume (ml)	laboratory number
0.01	088 153
0.1	054
1.0	086

Alternative/Rapid Method	laboratory number
Loop Mediated Isothermal Amplification (LAMP)	054
MOLDI-TOF	166
PCR	052 080 086
Reveal	180

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Incubation Temperature (°C)	laboratory number
35	092 180
37	052 054 086 111 135 153 191
41.5	080 088 166

Time Incubated (hours) Approximately	laboratory number
18	088
24	052 054 080 086 092 111 135 153 166 180 191

Confirmation of Organism's Identity	laboratory number
API 20E	054 088 111 153 191
beta-glucoronidase activity	088
Fermentation of Carbohydrates	153
Indole production	153
Latex slide agglutination	088 092 166
Oxidase reaction	088 153
Serological agglutination test	080 180
PCR	052 080 086 135
VITEK	180

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APPENDIX IV: Fapas® SecureWeb, Protocol and Contact Details

1. Fapas® SECUREWEB

Access to the secure area of our website is only available to participants in our proficiency tests. Please contact us if you require a UserID and Password. Fapas® SecureWeb allows participants to:

- Obtain their laboratory numbers for the proficiency tests in which they have participated.
- View the results they submitted in past and current proficiency tests.
- Submit their results and methods for current tests.
- Review future tests they have ordered.
- Order proficiency tests, reference materials and quality control materials.
- Freely download copies of reports, in Acrobat PDF format, of proficiency tests in which they have participated.

2. PROTOCOL

The Protocols [4, 5] set out how Fapas® – Food Microbiology is organised. Copies can be downloaded from our website.

3. CONTACT DETAILS

This report was prepared and authorised on behalf of Fapas® by Emma Hutton (Round Coordinator). Participants with any comments or concerns about this proficiency test should contact:

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