Fapas® – Food Microbiology Proficiency Test Report 248

November - December 2019

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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 materials for Fapas® – Food Microbiology proficiency test Distribution 248 were dispatched in November 2019. Test materials for 13 proficiency tests were available in this distribution:

   M248e04 Enumeration of Enterobacteriaceae / Coliforms / *Escherichia coli* (equivalent to 10 g beef)

   M248e09 Aerobic Plate Count in chicken (equivalent to 10 g chicken)

   M248e17 Enumeration of *Campylobacter* spp. in chicken (equivalent to 10 g chicken)

   M248e15 Enumeration of Yeasts and Moulds [SUM] (equivalent to 10 g flour)

   M248d021 Detection of *Listeria monocytogenes* / *Listeria* spp. (equivalent to 25 g chicken x 2)

   M248d11 Detection of *Escherichia coli* O157:H7 (equivalent to 25 g sprouting seeds and lettuce x 2)

   M248d022 Detection of *Listeria monocytogenes* / *Listeria* spp. (equivalent to 25 g mixed vegetables x 2)

   M248d07 Detection of *Salmonella* spp. (equivalent to 25 g ground pepper x 2)

   M248d21 Detection of *Vibrio parahaemolyticus* (equivalent to 25 g fish x 2).

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

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

proficiency test	assigned value, x_a	units	number of scores, $\|z\| \leq 2$	total number of scores	% $\|z\| \leq 2$
enumeration of enterobacteriaceae in beef	4.27	$\log_{10}$ cfu/g	103	111	93
enumeration of coliforms in beef	4.20	$\log_{10}$ cfu/g	101	111	91
enumeration of *Escherichia coli* in beef	3.69	$\log_{10}$ cfu/g	111	121	92
aerobic plate count in chicken	4.77	$\log_{10}$ cfu/g	51	54	94
enumeration of *Campylobacter* spp. in chicken	3.56	$\log_{10}$ cfu/g	29	37	78
enumeration of yeasts and moulds in flour	3.89	$\log_{10}$ cfu/g	72	76	95

4. 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.

5. Results 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 present test material B absent	31	35	89	6	6
detection of *Listeria* spp. in chicken	test material A present test material B absent	17	23	74	21	4
detection of *Escherichia coli O157*:H7 in sprouting seeds and lettuce	test material A absent test material B present	10	10	100	0	0
detection of *Listeria monocytogenes* in mixed vegetables	test material A present test material B absent	30	31	97	3	0
detection of *Listeria* spp. in mixed vegetables	test material A present test material B absent	17	19	89	11	0
detection of *Salmonella spp*. in ground pepper	test material A absent test material B present	25	27	93	0	7
detection of *V. parahaemolyticus* in fish	test material A present test material B absent	55	59	93	3	7

6. Quality control materials are available for purchase from our website for:

TM248e15QC Enumeration of yeasts and moulds [SUM] in flour

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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 tests 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.

The test materials were stored at +4°C ±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.

2.3. Dispatch

The start date was 25 November 2019. Test materials were sent to 364 participants.

2.4. Storage and Preparation Instructions

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

Participants are reminded that it is crucial to the outcome of the proficiency tests that the instructions for the preparation of the test materials are followed exactly.

3. RESULTS

The instructions for reporting results were as follows:

- Start the analysis between 25 November and 04 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 342 participants (94%) before the closing date for this test, 19 December 2019.

Each participant was given a laboratory number, assigned in order of receipt of results. The reported results are given in Tables 1 to 11.

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 test in enumeration was derived from the consensus of the results submitted by participants. The procedure used to derive this consensus involved a $\log_{10}$ transformation of submitted results to obtain a normal distribution.

The following results were excluded from the calculation of the assigned value:

- non-numerical results i.e. qualitative or semi-quantitative results,
- results reported as approximately 10, 100 or 1000 × greater or smaller than the majority of submitted results (as these were considered to be reporting errors).

For the enumeration of enterobacteriaceae / coliforms / *Escherichia coli* in beef, aerobic plate count in chicken and the enumeration of yeasts and moulds [SUM] in flour, this procedure was straightforward and the robust mean was chosen as the assigned value.

For enumerations of *Campylobacter* spp. in chicken the mode was chosen because the distribution was slightly skewed. The mode was considered the best estimate of consensus and consequently was set as the assigned value. A kernel density plot of the submitted results is shown as an insert to Figure 5.

The assigned values for all tests in enumeration, together with their uncertainties are shown in Table 12.

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 appropriate members of the Fapas® Advisory Committee have agreed this value corresponds to 0.25 $\log_{10}$ cfu/g.

The values for σ_p used to calculate z-scores from the reported results of this test are given in Table 12.

4.3. Individual z-Scores and Assessments

Participants' z-scores were calculated as:

$$z = \frac{(\log_{10} x - x_a)}{\sigma_p}$$

where x = the participant's reported result expressed as $\log_{10}$ cfu/g,
x_a = the assigned value, see Table 12,
and σ_p = the standard deviation for proficiency, see Table 12.

Participants' z-scores for the proficiency tests in enumeration are given in Tables 1 to 6 and shown as histograms in Figure 1 to Figure 6. 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 12.

The number and percentage of z-scores in the range -2 ≤ z ≤ 2 for all enumeration tests are given in Table 13.

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 Tables 7 to 11.

Intended results for these detection tests are shown in Table 14.

The number and percentage of satisfactory assessments are given in Table 15.

5. INTERPRETATION OF SCORES AND ASSESSMENTS

In normal circumstances, over time, about 95% of z-scores will lie in the range -2 ≤ z ≤ 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.

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.

Table 1: Results and z-Scores for Enterobacteriaceae in Beef

laboratory number	enterobacteriaceae			
	assigned value: 4.27 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
001	14909	4.17	No	-0.4
002				
007	2.42E+4	4.38	yes	0.5
010	1218	3.09	No	**-4.7**
017	2.7E+4	4.43	No	0.7
018	3.6E+4	4.56	NO	1.2
021	32000	4.51	No	0.9
022				
023	2.0E+4	4.30	NO	0.1
024				
025	31000	4.49	no	0.9
026	2.2E+4	4.34	no	0.3
029	1.3E+4	4.11	no	-0.6
030	3.2E+4	4.51	NO	0.9
031	2.8E+4	4.45	no	0.7
032	13000	4.11	no	-0.6
035	20.6E+3	4.31	yes	0.2
037	1.4E+4	4.15	no	-0.5
041	9.1E+3	3.96	NO	-1.2

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 1 (continued): Results and z-Scores for Enterobacteriaceae in Beef

laboratory number	enterobacteriaceae			
	assigned value: 4.27 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
042				
043	2.3E+4	4.36	no	0.4
050	1.9E+4	4.28	no	0.0
053	2.4E+4	4.38	No	0.4
057	2.5E4	4.40	no	0.5
058	2.4E+4	4.38	no	0.4
059	1.3E+4	4.11	No	-0.6
061	2.2E+4	4.34	no	0.3
063	12.0E+2	3.08	No	**-4.8**
065	18000	4.26	NO	-0.1
071				
076				
078	1.5E+4	4.18	no	-0.4
081	3.0E+4	4.48	1	0.8
083	1.57E+4	4.20	NO	-0.3
086	19000	4.28	no	0.0
093				
096	4.8E+4 *	4.68	no	1.7
106	1.6E+4	4.20	no	-0.3

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 1 (continued): Results and z-Scores for Enterobacteriaceae in Beef

laboratory number	enterobacteriaceae			
	assigned value: 4.27 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
107	2.8E+4	4.45	hayÄ±r	0.7
108	2.5E+4	4.40	no	0.5
111	2.6E+4	4.41	no	0.6
112	23000	4.36	NO	0.4
116	1.6E+4	4.20	NO	-0.3
117	1.2E+4	4.08	no	-0.8
121	21000	4.32	N	0.2
124	2.0E+4	4.30	no	0.1
128	1.2E+4	4.08	No	-0.8
130	1.7E+4	4.23	NO	-0.1
131	1.1E+4	4.04	HayÄ±r	-0.9
132	10200	4.01	no	-1.0
134	2.2E+4	4.34	no	0.3
139				
141				
143	13909	4.14	No	-0.5
144	20000 *	4.30	no	0.1
146	9.8E+3	3.99	No	-1.1
147				

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 1 (continued): Results and z-Scores for Enterobacteriaceae in Beef

laboratory number	enterobacteriaceae			
	assigned value: 4.27 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
148	198E+2	4.30	no	0.1
149	1.4E+4	4.15	no	-0.5
150	1.9E+4	4.28	no	0.0
151	1.9E+4	4.28	yes	0.0
153	2.5E+4	4.40	NO	0.5
156	18400	4.26	No	0.0
162	3.2E+4	4.51	no	0.9
164	4.2E+3	3.62	no	**-2.6**
166	2.6E+4	4.41	no	0.6
176	2.3E+4	4.36	NO	0.4
177	20900	4.32	no	0.2
178	17000	4.23	no	-0.1
181	23000	4.36	NO	0.4
182	2.3E+4	4.36	no	0.4
183	1.47E+4	4.17	yes	-0.4
184	1.45E+4	4.16	no	-0.4
188	1.4E+4	4.15	no	-0.5
189	1.67E+5	5.22	No	**3.8**
192	1.9E+4	4.28	NO	0.0

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 1 (continued): Results and z-Scores for Enterobacteriaceae in Beef

laboratory number	enterobacteriaceae			
	assigned value: 4.27 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
196	3.0E+4	4.48	No	0.8
197	25000	4.40	yes	0.5
200	1.3E+4	4.11	no	-0.6
204				
205				
206				
208	1.2E+4	4.08	NO	-0.8
209	2.4E+4	4.38	NO	0.4
211	1.2E+4	4.08	Ä?SN EN ISO 21528-2	-0.8
214	2.0E+4	4.30	NO	0.1
216	25000	4.40	NO	0.5
217	14700 *	4.17	Yes	-0.4
219	1.8E+4	4.26	no	-0.1
222	3.36E+4	4.53	No	1.0
225				
230	1.6E+4	4.20	no	-0.3
236				
237	1.4E+4	4.15	NO	-0.5
241				

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 1 (continued): Results and z-Scores for Enterobacteriaceae in Beef

laboratory number	enterobacteriaceae			
	assigned value: 4.27 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
253	1.5E+4	4.18	NO	-0.4
256	17075	4.23	yes	-0.1
262				
263	2.1E+4	4.32	NO	0.2
265	1.5E+4	4.18	no	-0.4
266	>2200		yes	
268	15000 #	4.18	no	-0.4
274	24000	4.38	no	0.4
275	1.8E+4	4.26	no	-0.1
277	4.6E+3	3.66	yes	**-2.4**
279	2.5E+4	4.40	no	0.5
280				
281	1.8E+4	4.26	no	-0.1
282	2.3E+4	4.36	YES	0.4
283	0 #		NO	
285	1.7E+4	4.23	No	-0.1
288				
290	1.80E+4	4.26	no	-0.1
293	2.4E+4	4.38	no	0.4

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 1 (continued): Results and z-Scores for Enterobacteriaceae in Beef

laboratory number	enterobacteriaceae			
	assigned value: 4.27 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
295	1.4E+4 *	4.15	no	-0.5
296	8.4E+3 #	3.92	N	-1.4
298	26000	4.41	no	0.6
302	24000	4.38	yes	0.4
303	21000	4.32	No	0.2
305	2.1E+4	4.32	no	0.2
311	3.2E+6	6.51	NO	**8.9**
314	2.40E+04	4.38	no	0.4
317	2.0E+4	4.30	no	0.1
323	2.0E+4	4.30	no	0.1
324	2.0E+4	4.30	no	0.1
325	1.8E+4	4.26	no	-0.1
332	1.1E+4 *	4.04	no	-0.9
333	2.1E+3	3.32	no	**-3.8**
335	1.5E+4	4.18	no	-0.4
336	16333	4.21	yes	-0.2
337	16545	4.22	yes	-0.2
340	2900 *	3.46	no	**-3.2**

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 2: Results and z-Scores for Coliforms in Beef

laboratory number	coliforms			
	assigned value: 4.20 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
001	10818	4.03	No	-0.7
002	17100	4.23	no	0.1
007	2.38E+4	4.38	yes	0.7
010	881	2.94	No	**-5.0**
017	2.6E+4	4.41	No	0.8
018	3.5E+4	4.54	NO	1.4
021	29000	4.46	No	1.0
022	2.6E+4	4.41	yes	0.8
023	1.6E+4	4.20	NO	0.0
024	1.5E+4	4.18	No	-0.1
025	19000	4.28	no	0.3
026				
029	4.6E+3	3.66	yes	**-2.2**
030				
031	2.4E+4	4.38	no	0.7
032	16000	4.20	no	0.0
035				
037	4.6E+4	4.66	yes	1.8
041	6.8E+3	3.83	NO	-1.5

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 2 (continued): Results and z-Scores for Coliforms in Beef

laboratory number	coliforms			
	assigned value: 4.20 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
042	9.2E+3	3.96	no	-1.0
043	1.8E+4	4.26	yes	0.2
050	2.8E+4	4.45	no	1.0
053	1.8E+4	4.26	No	0.2
057	2.4E4	4.38	no	0.7
058				
059	1.3E+4	4.11	No	-0.4
061	2.2E+4	4.34	no	0.6
063	12.0E+2	3.08	No	**-4.5**
065	18000	4.26	NO	0.2
071	11000	4.04	no	-0.7
076	2.4E+4	4.38	yes	0.7
078	2.0E+4	4.30	no	0.4
081	1.7E+4	4.23	1	0.1
083	1.41E+4	4.15	NO	-0.2
086	17000	4.23	no	0.1
093				
096	4.3E+4 *	4.63	no	1.7
106	1.6E+4	4.20	no	0.0

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 2 (continued): Results and z-Scores for Coliforms in Beef

laboratory number	coliforms			
	assigned value: 4.20 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
107	1.8E+4	4.26	hayÄ±r	0.2
108	2.5E+4	4.40	no	0.8
111				
112	19000	4.28	NO	0.3
116	1.4E+4	4.15	NO	-0.2
117	1.1E+4	4.04	no	-0.7
121	15000	4.18	N	-0.1
124	1.7E+4	4.23	no	0.1
128	4.6E+4	4.66	Yes	1.8
130				
131	8.8E+3	3.94	HayÄ±r	-1.0
132				
134	1.8E+4	4.26	no	0.2
139	1.8E+4 *	4.26	NO	0.2
141	1.9E+4	4.28	no	0.3
143	11682	4.07	No	-0.5
144	13000 *	4.11	no	-0.4
146	9.0E+3	3.95	No	-1.0
147	1.6E+4 *	4.20	YES	0.0

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 2 (continued): Results and z-Scores for Coliforms in Beef

laboratory number	coliforms			
	assigned value: 4.20 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
148	122E+2	4.09	no	-0.5
149	1.4E+4	4.15	no	-0.2
150	1.3E+4	4.11	no	-0.4
151	2E+4	4.30	yes	0.4
153	2.2E+4	4.34	NO	0.6
156	15867	4.20	No	0.0
162				
164	4.7E+3	3.67	no	**-2.1**
166				
176	2.0E+4	4.30	NO	0.4
177	24500	4.39	no	0.7
178	20000	4.30	no	0.4
181	17000	4.23	NO	0.1
182				
183				
184				
188	4.4E+3	3.64	no	**-2.2**
189	1.42E+5	5.15	No	**3.8**
192	2.0E+4	4.30	NO	0.4

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 2 (continued): Results and z-Scores for Coliforms in Beef

laboratory number	coliforms			
	assigned value: 4.20 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
196	3.4E+4	4.53	No	1.3
197				
200	1.5E+4	4.18	yes	-0.1
204	6.7e+4 *	4.83	Ð´Ð°	**2.5**
205	17000	4.23	Yes	0.1
206	1.2E+4	4.08	No	-0.5
208	1.3E+4	4.11	NO	-0.4
209				
211	1.1E+4	4.04	Ä?SN ISO 4832	-0.7
214	2.0E+4	4.30	NO	0.4
216	23000	4.36	NO	0.6
217	20600 *	4.31	Yes	0.4
219				
222				
225	16000	4.20	1	0.0
230	1.1E+4	4.04	yes	-0.7
236	1.4E+4	4.15	NO	-0.2
237	1.5E+4	4.18	YES	-0.1
241	1.8E+4	4.26	NO	0.2

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 2 (continued): Results and z-Scores for Coliforms in Beef

laboratory number	coliforms			
	assigned value: 4.20 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
253	1.5E+4	4.18	NO	-0.1
256	16825	4.23	yes	0.1
262	1.4e+4 *	4.15	no	-0.2
263	1.9E+4	4.28	NO	0.3
265	1.4E+4	4.15	no	-0.2
266	>2200		yes	
268	13000 #	4.11	no	-0.4
274	20000	4.30	no	0.4
275	1.6E+4	4.20	no	0.0
277	4.6E+3	3.66	yes	**-2.2**
279	9.3E+3	3.97	yes	-0.9
280	12000	4.08	yes	-0.5
281	2.4E+4	4.38	yes	0.7
282	1.1E+4	4.04	NO	-0.7
283	0 #		NO	
285	2.5E+4	4.40	No	0.8
288	6.4E+3	3.81	yes	-1.6
290				
293				

z-scores outside |z| >2 are shown in **bold,** see Section
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 2 (continued): Results and z-Scores for Coliforms in Beef

laboratory number	coliforms			
	assigned value: 4.20 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
295	9.0E+3 *	3.95	no	-1.0
296	9.5E+3 #	3.98	N	-0.9
298	17000	4.23	no	0.1
302	19150	4.28	yes	0.3
303	26000	4.41	No	0.8
305	1.5E+4	4.18	no	-0.1
311	2.9E+6	6.46	NO	**9.0**
314	1.20E+04	4.08	yes	-0.5
317	1.2E+4	4.08	yes	-0.5
323	1.7E+4	4.23	no	0.1
324	1.5E+4	4.18	yes	-0.1
325	9.3E+3	3.97	yes	-0.9
332	2.3E+4 *	4.36	yes	0.6
333	1.4E+4	4.15	no	-0.2
335	1.1E+4	4.04	no	-0.7
336	27272	4.44	yes	0.9
337	20000	4.30	yes	0.4
340	1800 *	3.26	no	**-3.8**

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

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

laboratory number	*Escherichia coli*			
	assigned value: 3.69 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
001	5454	3.74	No	0.2
002	5100	3.71	no	0.1
007	5.4E+3	3.73	yes	0.2
010	454	2.66	No	**-4.1**
017	6.5E+3	3.81	No	0.5
018	5.4E+3	3.73	NO	0.2
021	7300	3.86	No	0.7
022	7.5E+3	3.88	yes	0.7
023	5.3E+3	3.72	NO	0.1
024	5.0E+3	3.70	No	0.0
025	3500	3.54	no	-0.6
026	6.0E+3	3.78	no	0.4
029	2.9E+3	3.46	no	-0.9
030	5.1E+3	3.71	NO	0.1
031	7.1E+3	3.85	no	0.6
032	2900	3.46	no	-0.9
035	8.6E+3	3.93	yes	1.0
037	4.6E+3	3.66	yes	-0.1
041	4.5E+3	3.65	NO	-0.1

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

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

laboratory number	*Escherichia coli*			
	assigned value: 3.69 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
042	8.1E+3	3.91	no	0.9
043	6.8E+3	3.83	yes	0.6
050	5.5E+3	3.74	no	0.2
053	5.7E+3	3.76	No	0.3
057	8.1E3	3.91	no	0.9
058	4.6E+3	3.66	no	-0.1
059	3.2E+3	3.51	No	-0.7
061	4.3E+3	3.63	no	-0.2
063	7.0E+2	2.85	No	**-3.4**
065	4600	3.66	NO	-0.1
071	1600	3.20	no	-1.9
076	2.4E+4	4.38	yes	**2.8**
078	5.0E+3	3.70	no	0.0
081	7.8E+3	3.89	1	0.8
083	6.24E+3	3.80	NO	0.4
086	3600	3.56	no	-0.5
093	43.86E+2	3.64	No	-0.2
096	4.8E+3 *	3.68	no	0.0
106	5.1E+3	3.71	no	0.1

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

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

laboratory number	*Escherichia coli*			
	assigned value: 3.69 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
107	5.1E+3	3.71	hayÄ±r	0.1
108	1.1E+4	4.04	no	1.4
111	2.5E+3	3.40	no	-1.2
112	6200	3.79	NO	0.4
116	6.6E+3	3.82	NO	0.5
117	4.1E+3	3.61	no	-0.3
121	4400	3.64	N	-0.2
124	2.75E+3	3.44	no	-1.0
128	1.5E3	3.18	Yes	**-2.1**
130	5.6E+3	3.75	NO	0.2
131	1.2E+3	3.08	HayÄ±r	**-2.4**
132	2340	3.37	no	-1.3
134	6.7E+3	3.83	no	0.5
139	4.0E+3 *	3.60	NO	-0.4
141	8.6E+3	3.93	no	1.0
143	2318	3.37	No	-1.3
144	4100 *	3.61	no	-0.3
146	2.5E+3	3.40	No	-1.2
147	1.7E+3 *	3.23	YES	-1.8

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

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

laboratory number	*Escherichia coli*			
	assigned value: 3.69 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
148	62E+2	3.79	no	0.4
149	4.1E+3	3.61	no	-0.3
150	4.8E+3	3.68	no	0.0
151	7.8E+3	3.89	yes	0.8
153	7.6E+3	3.88	NO	0.8
156	6080	3.78	No	0.4
162	7.5E+3	3.88	no	0.7
164	1.3E+3	3.11	no	**-2.3**
166				
176	5.4E+3	3.73	NO	0.2
177	6900	3.84	no	0.6
178	6100	3.79	no	0.4
181	13600	4.13	NO	1.8
182	4.9E+3	3.69	no	0.0
183				
184				
188	4.1E+3	3.61	si	-0.3
189	5.9E+4	4.77	No	**4.3**
192	7.2E+3	3.86	NO	0.7

z-scores outside |z| >2 are shown in **bold,** see Section
* samples analysed outside of the required time frame
# samples received outside of the required time frame

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

laboratory number	*Escherichia coli*			
	assigned value: 3.69 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
196	1.5E+4	4.18	No	1.9
197				
200	4.5E+3	3.65	yes	-0.1
204	5.7E+4 *	4.76	Ð´Ð°	**4.3**
205	5000	3.70	Yes	0.0
206	3.6E+3	3.56	No	-0.5
208	5.1E+3	3.71	NO	0.1
209	6.2E+3	3.79	NO	0.4
211	2.8E+3	3.45	Ä?SN ISO 16649-2	-1.0
214	4.3E+3	3.63	NO	-0.2
216	2000	3.30	NO	-1.6
217	6300 *	3.80	Yes	0.4
219	6.2E+3	3.79	no	0.4
222	5.5E+3	3.74	No	0.2
225	5300	3.72	1	0.1
230	6.7E+3	3.83	yes	0.5
236	4.1E+3	3.61	NO	-0.3
237	4.3E+3	3.63	YES	-0.2
241	6.7E+3	3.83	NO	0.5

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

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

laboratory number	*Escherichia coli*			
	assigned value: 3.69 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
253	5.5E+3	3.74	NO	0.2
256	3420	3.53	yes	-0.6
262				
263	5.0E+3	3.70	NO	0.0
265	5.0E+3	3.70	no	0.0
266				
268	1000 #	3.00	no	**-2.8**
274	3800	3.58	no	-0.4
275	3.0E+3	3.48	no	-0.9
277	4.6E+3	3.66	yes	-0.1
279				
280	4600	3.66	yes	-0.1
281	4.6E+3	3.66	yes	-0.1
282	6.9E+3	3.84	YES	0.6
283	0 #		NO	
285	7.0E+3	3.85	No	0.6
288	5.2E+3	3.72	yes	0.1
290				
293				

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

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

laboratory number	*Escherichia coli*			
	assigned value: 3.69 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Most probable number technique used (yes/no)	z-score
295	2.5E+3 *	3.40	no	-1.2
296	3.7E+3 #	3.57	N	-0.5
298	7800	3.89	no	0.8
302	4550	3.66	yes	-0.1
303	5700	3.76	No	0.3
305	4.4E+3	3.64	no	-0.2
311	7.0E+5	5.85	NO	**8.6**
314	4.30E+03	3.63	yes	-0.2
317	4.3E+3	3.63	yes	-0.2
323	4.1E+3	3.61	no	-0.3
324	4.3E+3	3.63	yes	-0.2
325				
332	1.5E+4 *	4.18	yes	1.9
333	5.5E+3	3.74	no	0.2
335	3.3E+3	3.52	no	-0.7
336	8772	3.94	yes	1.0
337	4954	3.69	yes	0.0
340	1800 *	3.26	no	-1.7

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 4: Results and z-Scores for Aerobic Plate Count in Chicken

laboratory number	aerobic plate count		
	assigned value: 4.77 $\log_{10}$ cfu/g		
	result cfu/g	result $\log_{10}$ cfu/g	z-score
004	68000	4.83	0.2
006	6.4E+4	4.81	0.1
008	3.2E+4	4.51	-1.1
019	5.0E+4	4.70	-0.3
025	45000	4.65	-0.5
030	7.9e+4	4.90	0.5
036	83000	4.92	0.6
037	8.0E+4	4.90	0.5
038	4.3e+4	4.63	-0.6
039	6.2E+4	4.79	0.1
042	5.5E+4	4.74	-0.1
052	60000	4.78	0.0
061	6.6E+4	4.82	0.2
072	3.9E+4	4.59	-0.7
073	590000 *	5.77	**4.0**
081	7.8E+4	4.89	0.5
084	130000	5.11	1.4
088	6.2E+4	4.79	0.1
109	91000	4.96	0.7

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 4 (continued): Results and z-Scores for Aerobic Plate Count in Chicken

laboratory number	aerobic plate count		
	assigned value: 4.77 log_{10} cfu/g		
	result cfu/g	result log_{10} cfu/g	z-score
112	58000	4.76	0.0
115	6.6E+4	4.82	0.2
125	5.0E+4 *	4.70	-0.3
130	5.5E+4	4.74	-0.1
138	4.0E+2	2.60	**-8.7**
139	6.8E+4 *	4.83	0.2
154			
159	6.5E+4	4.81	0.2
160	62545	4.80	0.1
162	6.7E+4	4.83	0.2
166	5.5E+4	4.74	-0.1
174	48046 *	4.68	-0.4
181	53000 *	4.72	-0.2
189	5.55E+4 *	4.74	-0.1
192	6.0E+4	4.78	0.0
194	7.6E+4	4.88	0.4
206	6.2E+4	4.79	0.1
214	6.9E+4	4.84	0.3
217	63000 *	4.80	0.1

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 4 (continued): Results and z-Scores for Aerobic Plate Count in Chicken

laboratory number	aerobic plate count		
	assigned value: 4.77 log_{10} cfu/g		
	result cfu/g	result log_{10} cfu/g	z-score
225	49000	4.69	-0.3
226	1.7E+5	5.23	1.8
228	5.3E+4	4.72	-0.2
230	6.8E+4	4.83	0.2
238	<10 *		
241	7.2E+4	4.86	0.3
246	4.6E+4	4.66	-0.4
251	6.5e+4 *	4.81	0.2
255	3.75E+4 *	4.57	-0.8
256	88250	4.95	0.7
262	5.3E+4 *	4.72	-0.2
265	7.5E+3	3.88	**-3.6**
277	4.2E+4	4.62	-0.6
303	69000	4.84	0.3
306	4.3E+4 #	4.63	-0.6
307	84500	4.93	0.6
311	2.7E+4	4.43	-1.4
340	20000 *	4.30	-1.9

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 5: Results and z-Scores for *Campylobacter* spp. in Chicken

laboratory number	*Campylobacter* spp.			
	assigned value: 3.56 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Semi-quantitative method used? (yes/no)	z-score
008	4.6E+3	3.66	NO	0.4
032	3600	3.56	no	0.0
034	4.9E+3	3.69	no	0.5
040	8100 *	3.91	NO	1.4
057	1.4E4	4.15	no	**2.3**
064	1000	3.00	NO	**-2.2**
075	7.9E+2	2.90	no	**-2.7**
082	2.8E+3	3.45	no	-0.5
085	7.0E+3	3.85	no	1.1
097	3.2E+3	3.51	no	-0.2
110				
111	5.6E+3	3.75	no	0.8
126	2.5E+3 *	3.40	No	-0.7
144	Detected		no	
152	380	2.58	no	**-3.9**
153	4.8E+3	3.68	NO	0.5
154	2.2E+3	3.34	no	-0.9
160	6000	3.78	no	0.9
179	3390	3.53	no	-0.1
186	3.3E+3	3.52	no	-0.2

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 5 (continued): Results and z-Scores for *Campylobacter* spp. in Chicken

laboratory number	*Campylobacter* spp.			
	assigned value: 3.56 log_{10} cfu/g			
	result cfu/g	result log_{10} cfu/g	Semi-quantitative method used? (yes/no)	z-score
188	4.2E+3	3.62	no	0.3
202	2663	3.43	No	-0.5
213	3750 *	3.57	Yes	0.1
219	1.9E+3	3.28	no	-1.1
225				
227	3.2E+3 *	3.51	NO	-0.2
247	2.9E+2	2.46	No	**-4.4**
261	7.3E+3	3.86	no	1.2
267	1300 *	3.11	Nein	-1.8
269	390 *	2.59	No	**-3.9**
285	5.1E+3	3.71	no	0.6
288	2.7E+3	3.43	no	-0.5
289	1.1E+3	3.04	No	**-2.1**
294	6600	3.82	no	1.0
307	300	2.48	yes	**-4.3**
326	1.5E+3 *	3.18	no	-1.5
327	1.9E+3	3.28	no	-1.1
335	2E+3	3.30	no	-1.0
339	9800 *	3.99	yes	1.7
341	3636	3.56	no	0.0

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 6: Results and z-Scores for Yeasts and Moulds in Flour

laboratory number	yeasts and moulds		
	assigned value: 3.89 $\log_{10}$ cfu/g		
	result cfu/g	result $\log_{10}$ cfu/g	z-score
022	1.7E+4	4.23	1.4
023	1.1E+4	4.04	0.6
027	8.8E+3	3.94	0.2
028	7.3E+3	3.86	-0.1
031	8.2E+3	3.91	0.1
037	7.9E+3	3.90	0.0
045	7.5E+3	3.88	-0.1
046	1.9E+4	4.28	1.6
063	5.0E+3	3.70	-0.8
066	77.72E+4	5.89	**8.0**
068	11500	4.06	0.7
080	9.8E+3	3.99	0.4
081	1.5E+4	4.18	1.1
090	3591	3.56	-1.3
091	7682	3.89	0.0
092	1.1E+4	4.04	0.6
095	1.5E+4	4.18	1.1
096	9.8E+3	3.99	0.4
099	9.9E+3	4.00	0.4

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 6 (continued): Results and z-Scores for Yeasts and Moulds in Flour

laboratory number	yeasts and moulds		
	assigned value: 3.89 $\log_{10}$ cfu/g		
	result cfu/g	result $\log_{10}$ cfu/g	z-score
100	7.9E+3	3.90	0.0
103	9.0E+3	3.95	0.3
119	1.01E4	4.00	0.5
123	1.2E+4	4.08	0.8
127	3.0E+3 *	3.48	-1.7
128	7.7E+3	3.89	0.0
137	70000 *	4.85	**3.8**
143	9341	3.97	0.3
144	7000 *	3.85	-0.2
151	5.77E+3	3.76	-0.5
159	7.5E+3	3.88	-0.1
160	11181	4.05	0.6
163	9.1E+3 *	3.96	0.3
169	7400	3.87	-0.1
173	7500	3.88	-0.1
185	7.5E+3	3.88	-0.1
191	8.2E+2 *	2.91	**-3.9**
193	7.4E+3	3.87	-0.1
198	3.0E+3 #	3.48	-1.7

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 6 (continued): Results and z-Scores for Yeasts and Moulds in Flour

laboratory number	yeasts and moulds		
	assigned value: 3.89 log_{10} cfu/g		
	result cfu/g	result log_{10} cfu/g	z-score
201	5.9E+3 *	3.77	-0.5
206	5.6E+3	3.75	-0.6
216	7300	3.86	-0.1
217	8000 *	3.90	0.0
218	9.7E+3	3.99	0.4
222	9.0E+3	3.95	0.3
225	11000	4.04	0.6
227	5.3E+3 *	3.72	-0.7
234	8.9E+3	3.95	0.2
239	1.0E+4	4.00	0.4
241	6.9E+3 *	3.84	-0.2
242	3.8E+3	3.58	-1.2
243	7400	3.87	-0.1
247	5.5E+3	3.74	-0.6
251	5.8E+3 *	3.76	-0.5
254	6455	3.81	-0.3
256	8333	3.92	0.1
259	3.18E+3	3.50	-1.6
260	8.1E+3	3.91	0.1

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 6 (continued): Results and z-Scores for Yeasts and Moulds in Flour

laboratory number	yeasts and moulds		
	assigned value: 3.89 log_{10} cfu/g		
	result cfu/g	result log_{10} cfu/g	z-score
265	7.4E+3	3.87	-0.1
277	4.4E+3	3.64	-1.0
283	0 #		
284	11E+3	4.04	0.6
286	1.0E+4	4.00	0.4
287	200 *	2.30	**-6.4**
291	8.8E+3	3.94	0.2
298	12000	4.08	0.8
299	8.6E+3	3.93	0.2
303	10000	4.00	0.4
308	3E+3 #	3.48	-1.7
309	3.11E+3	3.49	-1.6
310	1.0E+4	4.00	0.4
322	7000 *	3.85	-0.2
329	7.2E+3	3.86	-0.1
330	4.5E+3 *	3.65	-1.0
331	7E+3 *	3.85	-0.2
336	6772	3.83	-0.2
337	5750	3.76	-0.5
342	8.7E+3	3.94	0.2

z-scores outside |z| >2 are shown in **bold,** see Section 5
* samples analysed outside of the required time frame
# samples received outside of the required time frame

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

laboratory number		*L. monocytogenes*			*Listeria* spp.		
		test material A	test material B	assessment	test material A	test material B	assessment
		result present	result absent		result present	result absent	
003		detected	not detected	S	detected	not detected	S
006		detected	not detected	S	detected	not detected	S
014		not detected	not detected	NS	detected	not detected	S
054		detected	not detected	S	detected	not detected	S
055		detected	not detected	S			
056		detected	not detected	S			
060		not detected	not detected	NS	detected	not detected	S
108		detected	not detected	S	detected	not detected	S
125	*	detected	not detected	S			
126		detected	not detected	S			
129		detected	not detected	S			
130		detected	not detected	S	detected		
136		detected	not detected	S			
160		detected	not detected	S	detected	not detected	S
162		detected	not detected	S			

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

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

laboratory number		*L. monocytogenes*			*Listeria* spp.		
		test material A	test material B	assessment	test material A	test material B	assessment
		result present	result absent		result present	result absent	
171		detected	not detected	S	not detected	not detected	NS
172		detected	not detected	S	detected	not detected	S
199		detected	not detected	S			
203	*	detected	not detected	S			
214		detected	not detected	S			
226		detected	not detected	S	detected	not detected	S
228		detected	not detected	S	detected	not detected	S
244		detected	not detected	S	detected	not detected	S
246		detected	not detected	S	detected	not detected	S
249		detected	not detected	S	detected	not detected	S
264		detected	not detected	S	detected	not detected	S
270	*	detected	not detected	S	detected	not detected	S
283	#	detected	detected	NS			
295	*	detected	not detected	S	not detected	not detected	NS
297	*	detected	not detected	S	not detected	not detected	NS

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

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

laboratory number		*L. monocytogenes*			*Listeria* spp.		
		test material A	test material B	assessment	test material A	test material B	assessment
		result present	result absent		result present	result absent	
304	*	detected	not detected	S	detected	not detected	S
306	#	detected	not detected	S	detected	not detected	S
318	*	detected	detected	NS	detected	detected	NS
319		detected	not detected	S	not detected	not detected	NS
329		detected	not detected	S	not detected	not detected	NS

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 8: Results and Assessments for *Escherichia coli O157*:H7 in Sprouting Seeds and Lettuce

laboratory number		*Escherichia coli O157*:H7		assessment
		test material A	test material B	
		result absent	result present	
012		not detected	detected	S
077		not detected	detected	S
094		not detected	detected	S
122		not detected	detected	S
131		not detected	detected	S
153		not detected	detected	S
192		not detected	detected	S
231		not detected	detected	S
257		not detected	detected	S
340	*	not detected	detected	S

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 9: Results and Assessments for *Listeria monocytogenes / Listeria spp.* in Mixed Vegetables

laboratory number		*L. monocytogenes*			*Listeria* spp.		
		test material A	test material B	assessment	test material A	test material B	assessment
		result present	result absent		result present	result absent	
015		detected	not detected	S			
016		detected	not detected	S			
033		detected	not detected	S			
044		detected	not detected	S	detected	not detected	S
087		detected	not detected	S			
094		detected	not detected	S	detected	not detected	S
133		detected	not detected	S	detected	not detected	S
135		detected	not detected	S	detected	not detected	S
152		detected	not detected	S			
161		detected	not detected	S	detected	not detected	S
165		detected	not detected	S	detected	not detected	S
176		detected	not detected	S			
182		detected	not detected	S	detected	not detected	S
207		detected	not detected	S	detected	not detected	S
210	*	detected	not detected	S			

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 9 (continued): Results and Assessments for *Listeria monocytogenes / Listeria spp.* in Mixed Vegetables

laboratory number		*L. monocytogenes*			*Listeria* spp.		
		test material A	test material B	assessment	test material A	test material B	assessment
		result present	result absent		result present	result absent	
214		detected	not detected	S			
215	*	detected	not detected	S			
223		detected	not detected	S			
225		detected	not detected	S	detected	not detected	S
230		detected	not detected	S	detected	not detected	S
232	*	detected	not detected	S	detected	not detected	S
233	*	detected	not detected	S	detected	not detected	S
235		detected	not detected	S	not detected	not detected	NS
257		not detected	not detected	NS	detected	not detected	S
272		detected	not detected	S	detected	not detected	S
276		detected	not detected	S			
306	#	detected	not detected	S	detected	not detected	S
313		detected	not detected	S	detected	not detected	S
322	*	detected	not detected	S	not detected	not detected	NS

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 9 (continued): Results and Assessments for *Listeria monocytogenes / Listeria spp.* in Mixed Vegetables

laboratory number	*L. monocytogenes*			*Listeria* spp.		
	test material A	test material B	assessment	test material A	test material B	assessment
	result present	result absent		result present	result absent	
333	detected	not detected	S	detected	not detected	S
338	detected	not detected	S			

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 10: Results and Assessments for *Salmonella spp.* in Ground Pepper

laboratory number		*Salmonella spp.*		assessment
		test material A	test material B	
		result absent	result present	
047		not detected	detected	S
051	*	not detected	detected	S
062		not detected	detected	S
069	*	not detected	detected	S
075		not detected	detected	S
085		not detected	detected	S
094		not detected	detected	S
102		not detected	detected	S
114		not detected	detected	S
157		not detected	detected	S
158		not detected	detected	S
166		not detected	detected	S
168		not detected	detected	S
180		not detected	detected	S
192		not detected	detected	S
195		not detected	detected	S
214		not detected	detected	S
215		not detected	detected	S
217	*	not detected	detected	S
223		not detected	detected	S

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 10 (continued): Results and Assessments for *Salmonella spp.* in Ground Pepper

laboratory number		*Salmonella spp.*		assessment
		test material A	test material B	
		result absent	result present	
252		not detected	detected	S
258		detected	detected	NS
278		not detected	detected	S
283	#	detected	detected	NS
300	*	not detected	detected	S
303		not detected	detected	S
328		not detected	detected	S

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 11: Results and Assessments for *Vibrio parahaemolyticus* in Fish

laboratory number		*Vibrio parahaemolyticus*		assessment
		test material A	test material B	
		result present	result absent	
005		detected	not detected	S
011		detected	not detected	S
012		detected	not detected	S
013		detected	not detected	S
020		detected	detected	NS
048		detected	not detected	S
049	*	detected	not detected	S
050		detected	not detected	S
064		detected	not detected	S
067		detected	not detected	S
070		detected	not detected	S
074		detected	not detected	S
079		detected	not detected	S
085		detected	not detected	S
089		detected	not detected	S
098		detected	not detected	S
101		detected	not detected	S
104		detected	not detected	S
105		detected	not detected	S
106		detected	not detected	S

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 11 (continued): Results and Assessments for *Vibrio parahaemolyticus* in Fish

laboratory number		*Vibrio parahaemolyticus*		assessment
		test material A	test material B	
		result present	result absent	
118		detected	not detected	S
120		detected	not detected	S
128		detected	not detected	S
132		detected	not detected	S
135		detected	not detected	S
138		detected	not detected	S
140		detected	not detected	S
146		detected	not detected	S
155		detected	not detected	S
167		detected	not detected	S
170		detected	not detected	S
174	*	detected	not detected	S
175		detected	not detected	S
181		detected	not detected	S
187		detected	not detected	S
192		detected	not detected	S
201	*	detected	not detected	S
212		detected	not detected	S
221		detected	detected	NS
227	*	not detected	detected	NS

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 11 (continued): Results and Assessments for *Vibrio parahaemolyticus* in Fish

laboratory number		*Vibrio parahaemolyticus*		assessment
		test material A	test material B	
		result present	result absent	
240		detected	not detected	S
245	*	detected	not detected	S
246		detected	not detected	S
265		detected	not detected	S
271		detected	not detected	S
273		detected	not detected	S
278		detected	not detected	S
285		detected	not detected	S
292		detected	not detected	S
301		detected	not detected	S
303		detected	not detected	S
312		detected	not detected	S
315		detected	not detected	S
316		detected	not detected	S
320		detected	not detected	S
321		detected	not detected	S
334		detected	not detected	S
338		not detected	detected	NS
340	*	detected	not detected	S

S = satisfactory
NS = not satisfactory
* samples analysed outside of the required time frame
# samples received outside of the required time frame

Table 12: Assigned Values and Standard Deviations for Proficiency

proficiency test	data points, *n*	assigned value, x_a	units	uncertainty, *u*	standard deviation for proficiency, σ_p
enumeration of enterobacteriaceae in beef	110	4.27	$\log_{10}$ cfu/g	0.01	0.25
enumeration of coliforms in beef	110	4.20	$\log_{10}$ cfu/g	0.02	0.25
enumeration of *Escherichia coli* in beef	120	3.69	$\log_{10}$ cfu/g	0.02	0.25
aerobic plate count in chicken	53	4.77	$\log_{10}$ cfu/g	0.02	0.25
enumeration of *Campylobacter* spp. in chicken	37	3.56	$\log_{10}$ cfu/g	0.06	0.25
enumeration of yeast and moulds in flour	74	3.89	$\log_{10}$ cfu/g	0.02	0.25

Table 13: Number and Percentage of z-Scores where $|z| \leq 2$

proficiency test	number of scores where $\|z\| \leq 2$	total number of scores	% $\|z\| \leq 2$
enumeration of enterobacteriaceae in beef	103	111	93
enumeration of coliforms in beef	101	111	91
enumeration of *Escherichia coli* in beef	111	121	92
aerobic plate count in chicken	51	54	94
enumeration of *Campylobacter* spp. in chicken	29	37	78
enumeration of yeasts and moulds in flour	72	76	95

Table 14: Intended Results for Proficiency Tests in Detection

proficiency test	test material A	test material B
detection of *Listeria monocytogenes* in chicken	present	absent
detection of *Listeria* spp. in chicken	present	absent
detection of *Escherichia coli O157*:H7 in sprouting seeds and lettuce	absent	present
detection of *Listeria monocytogenes* in mixed vegetables	present	absent
detection of *Listeria* spp. in mixed vegetables	present	absent
detection of *Salmonella spp*. in ground pepper	absent	present
detection of *Vibrio parahaemolyticus* in fish	present	absent

Table 15: 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	31	35	89	6	6
detection of *Listeria* spp. in chicken	17	23	74	21	4
detection of *Escherichia coli O157*:H7 in sprouting seeds and lettuce	10	10	100	0	0
detection of *Listeria monocytogenes* in mixed vegetables	30	31	97	3	0
detection of *Listeria* spp. in mixed vegetables	17	19	89	11	0
detection of *Salmonella spp*. in ground pepper	25	27	93	0	7
detection of *Vibrio parahaemolyticus* in fish	55	59	93	3	7

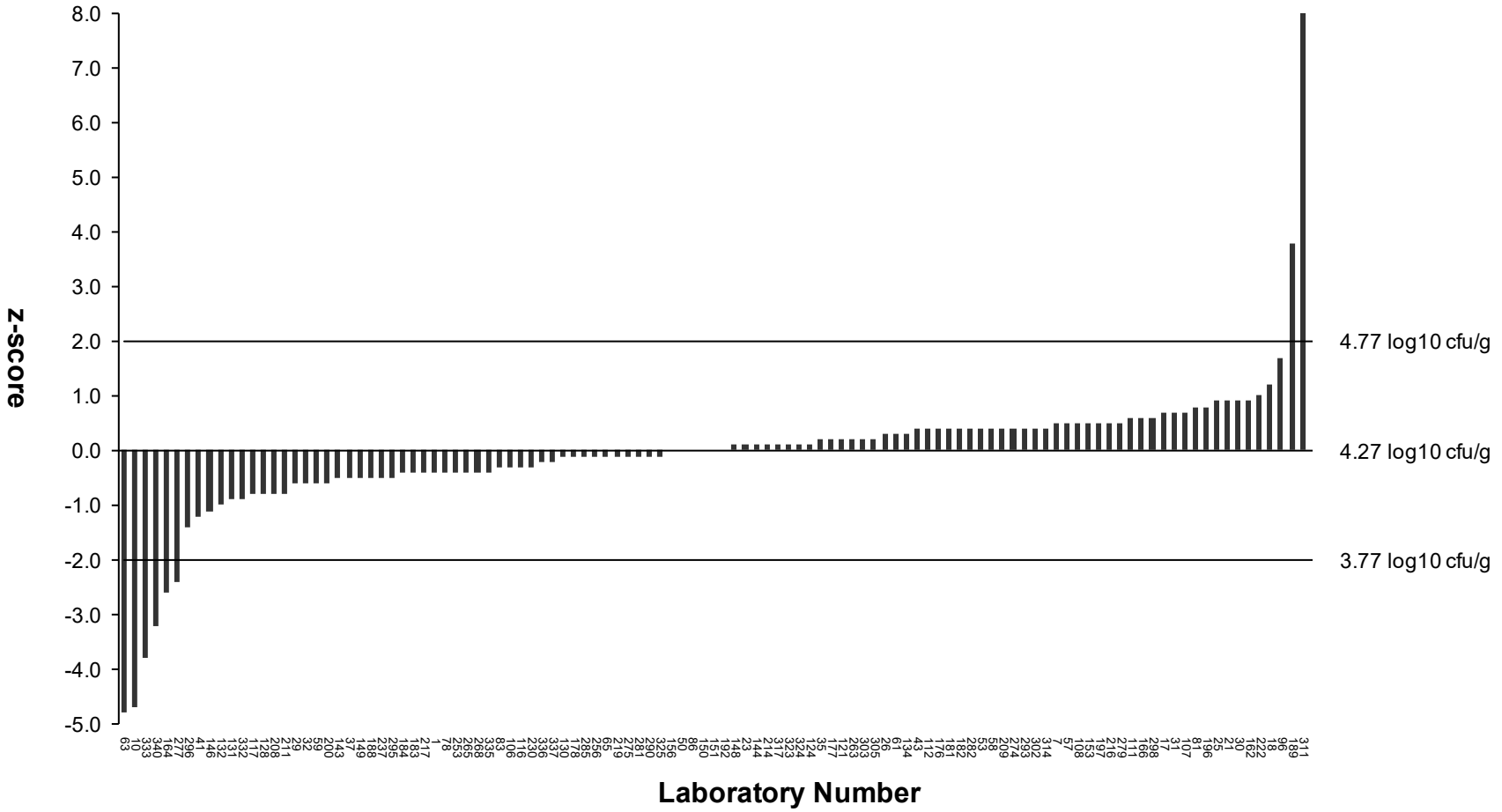

Figure 1: z-Scores for Enumeration of Enterobacteriaceae in Beef

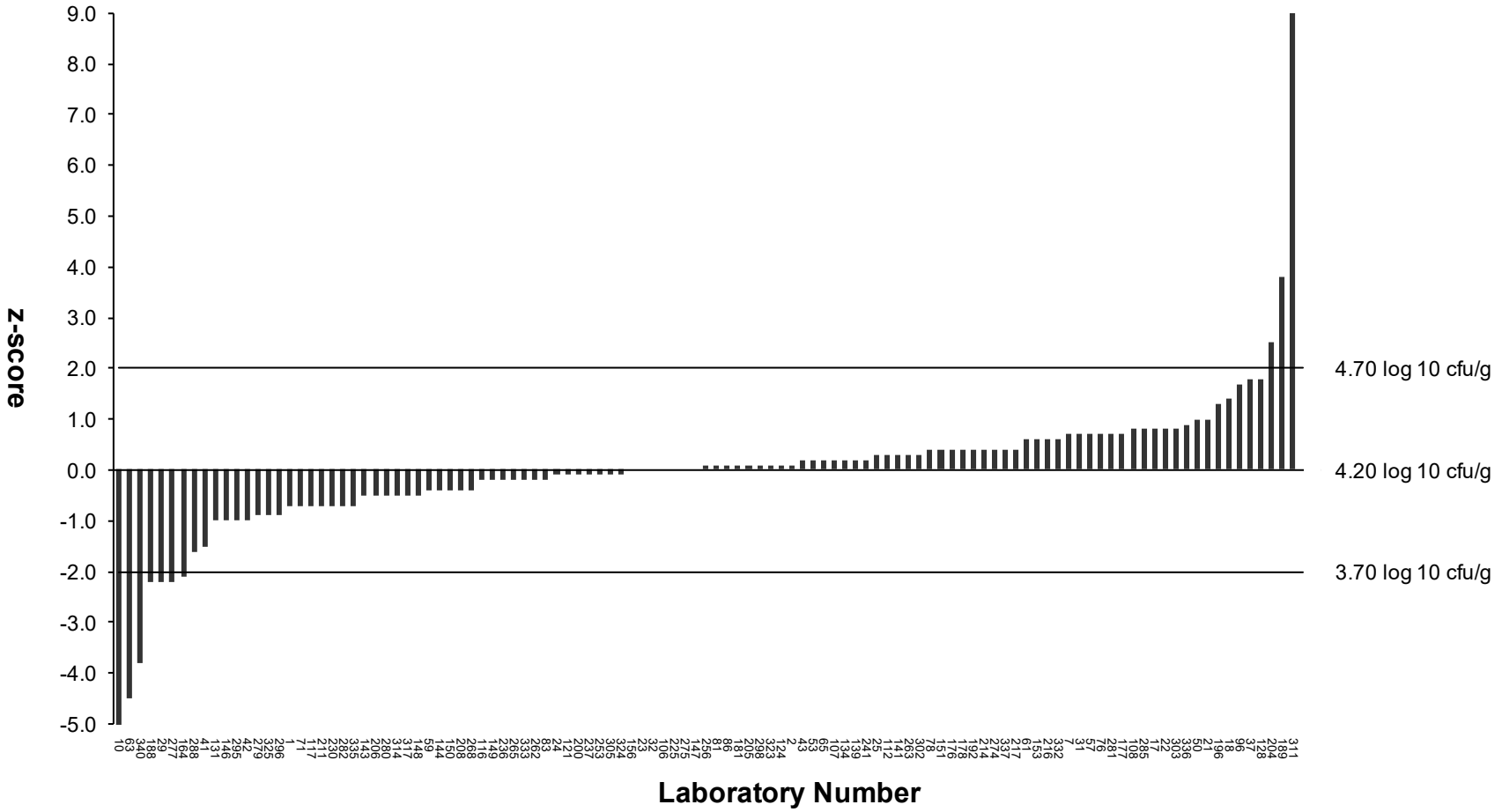

Figure 2: z-Scores for Enumeration of Coliforms in Beef

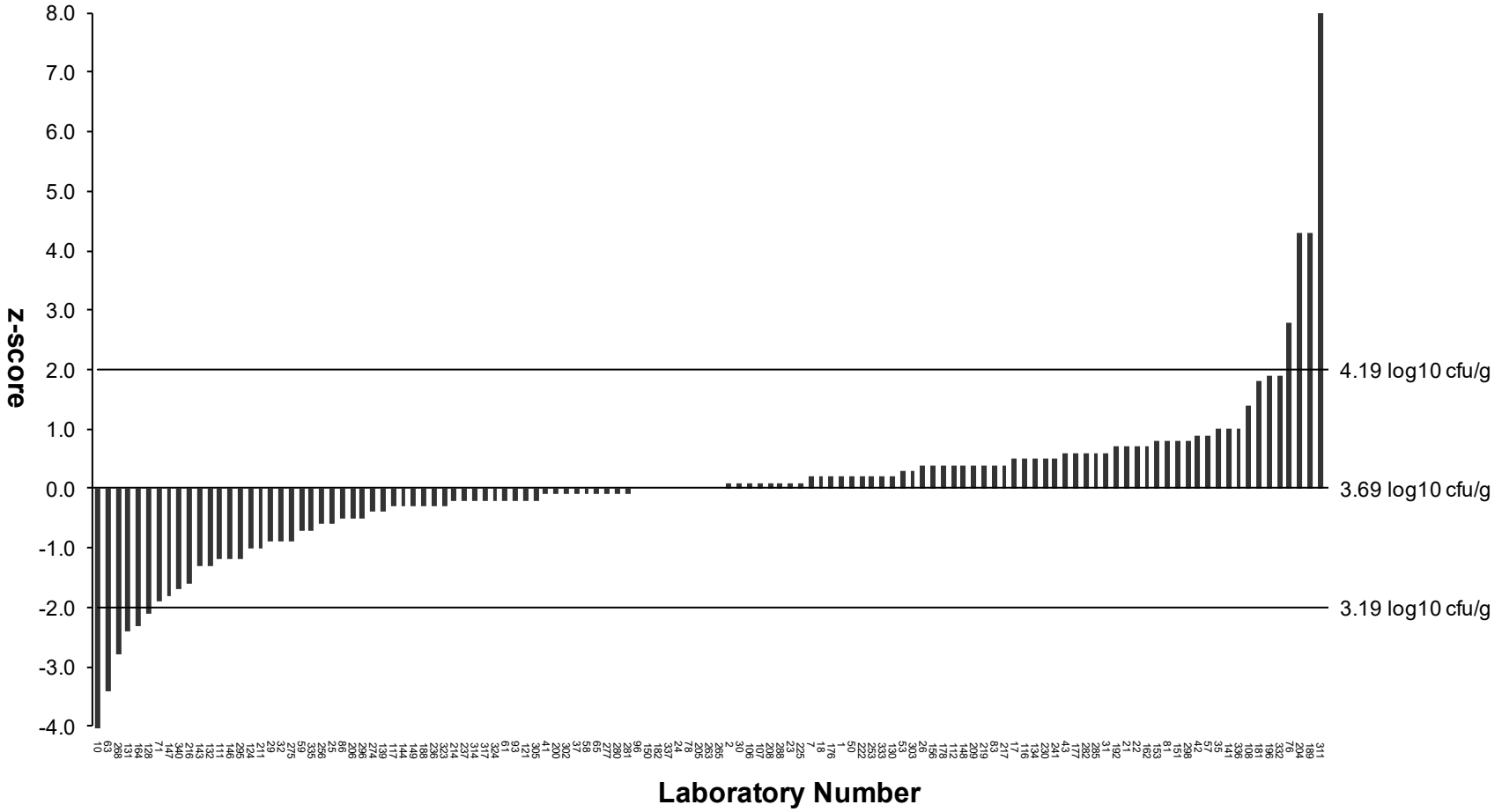

Figure 3: z-Scores for Enumeration of *Escherichia coli* in Beef

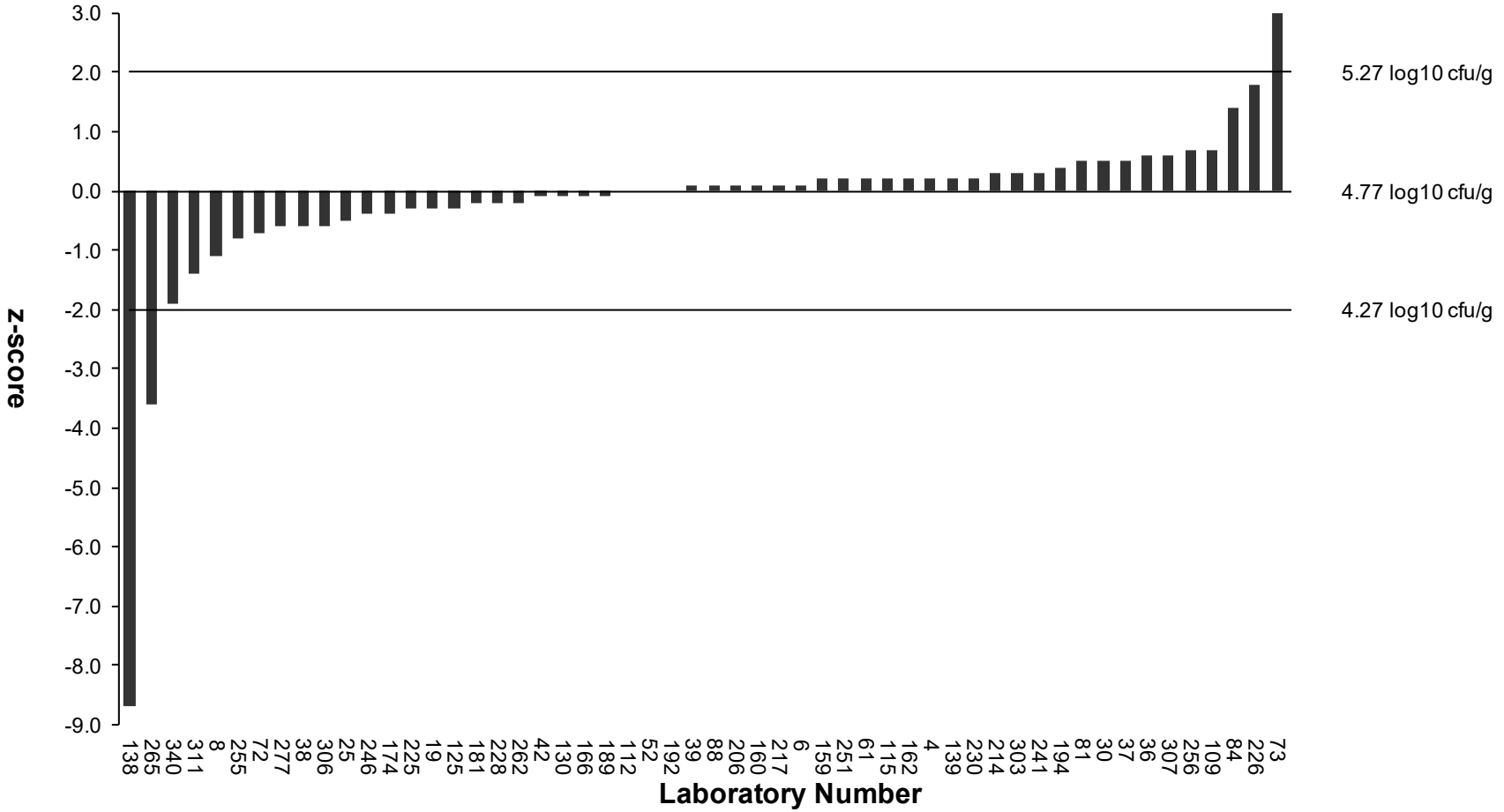

Figure 4: z-Scores for Enumeration of Aerobic Plate Count in Chicken

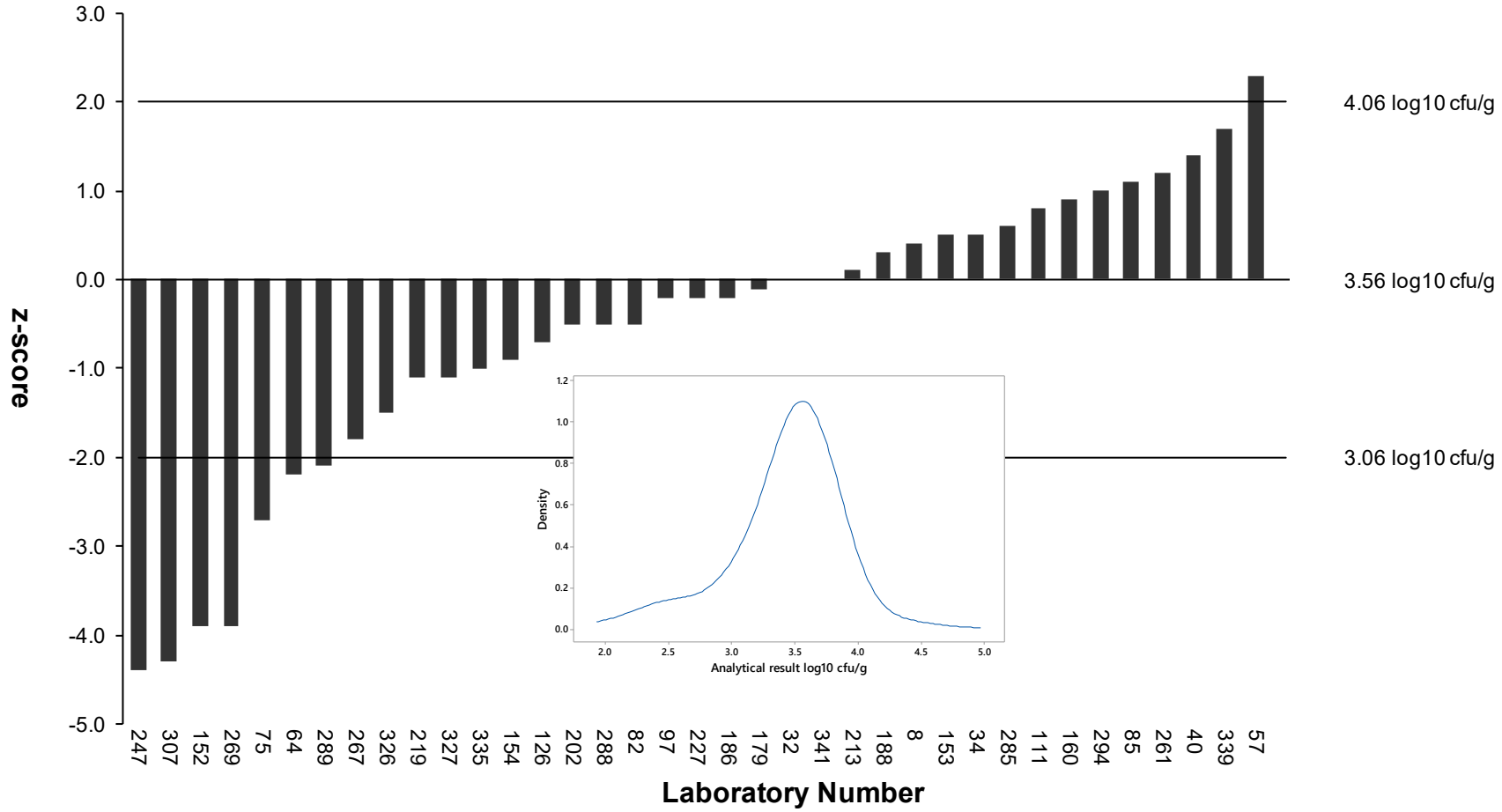

Figure 5: z-Scores for Enumeration of *Campylobacter* spp. in Chicken

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

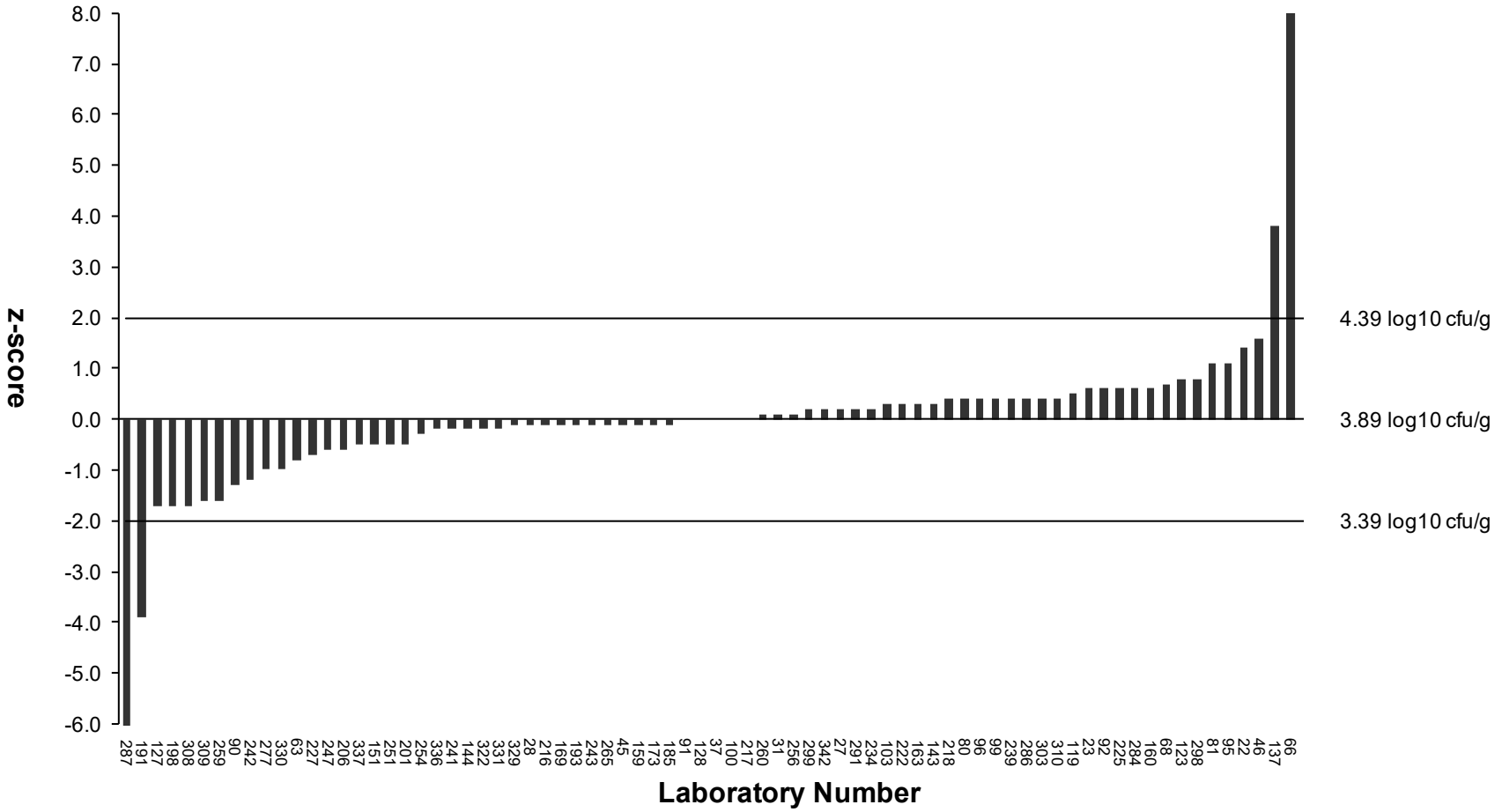

Figure 6: z-Scores for Enumeration of Yeasts and Moulds in Flour

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

proficiency test	matrix	target organism	background flora
enumeration of enterobacteriaceae / coliforms / *Escherichia coli*	beef	*Escherichia coli* *Enterobacter aerogenes*	*Kocuria rhizophila* *Staphylococcus aureus* *Bacillus cereus*
enumeration of aerobic plate count	chicken	*Lactobacillus plantarum* *Kocuria rhizophila* *Staphylococcus aureus*	not applicable
enumeration of *Campylobacter* spp.	chicken	*Campylobacter jejuni*	*E. coli*
enumeration of yeasts and moulds	flour	*Penicillium brevicompactum*	*Bacillus subtilis*
detection of *Listeria monocytogenes / Listeria spp.* test material A	chicken	*Listeria monocytogenes*	*S. aureus* *E. coli* *Proteus mirabilis*
detection of *Listeria monocytogenes / Listeria spp.* test material B	chicken	not applicable	*S. aureus* *E. coli* *P. mirabilis*
detection of *Escherichia coli O157*:H7 test material A	sprouting seeds and lettuce	not applicable	*E. coli* *Pseudomonas putida* *B. cereus*
detection of *Escherichia coli O157*:H7 test material B	sprouting seeds and lettuce	*Escherichia coli O157:H7*	*P. putida* *B. cereus*
detection of *Listeria monocytogenes / Listeria spp.* test material A	mixed vegetables	*L. monocytogenes*	*E. coli* *S. aureus* *P. putida*
detection of *Listeria monocytogenes / Listeria spp.* test material B	mixed vegetables	not applicable	*E. coli* *S. aureus* *P. putida*
detection of *Salmonella spp*. test material A	ground pepper	not applicable	*Bacillus coagulans* *Citrobacter freundii*
detection of *Salmonella spp*. test material B	ground pepper	*Salmonella* Cerro	*B. coagulans*
detection of *Vibrio parahaemolyticus* test material A	fish	*Vibrio parahaemolyticus*	*E. coli*
detection of *Vibrio parahaemolyticus* test material B	fish	not applicable	*E. coli*

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 in chicken	14 (5.4 to 35*) / 7.8 (2.5 to 25*)
Escherichia coli O157:H7 in sprouting seeds and lettuce	3.3 (1.1 to 10*) / 4.9 (1.5 to 16*)
Listeria monocytogenes in mixed vegetables	11 (3.8 to 30*) / 130 (44 to 380*)
Salmonella Cerro in ground pepper	350 (110 to 1100*) / 33 (11 to 110*)
Vibrio parahaemolyticus in fish	>1600 (650 to infinity*) / >1600 (650 to infinity*)

*confidence limit at >95%

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. In addition, responses not in English may have been omitted.

Enumeration of Enterobacteriaceae / Coliforms / *Escherichia coli* in Beef

Accredited Method Used	laboratory number
no	024 030 042 078 096 108 117 141 143 181 183 184 205 214 282 290 293 298
yes	001 017 018 021 025 029 031 035 041 050 053 057 058 061 063 065 076 081 083 093 106 107 121 130 131 132 134 139 144 146 147 148 150 153 156 162 164 166 176 178 182 188 189 192 196 197 200 204 208 209 216 219 225 230 237 241 253 262 263 265 268 274 275 277 279 280 281 283 285 288 296 302 303 305 311 314 323 325 332 335 340

Method Based on an International Standard	laboratory number
no	021 042 076 078 130 141 164 184 189 204 205 230 237 262 268 280 281 290 325
yes	001 017 018 024 025 029 030 031 035 041 050 053 057 058 059 063 065 081 083 093 096 106 107 108 116 121 131 132 134 139 143 144 146 147 148 150 153 156 162 176 178 181 182 183 188 192 196 197 200 208 209 214 216 219 225 241 253 263 265 274 275 277 279 282 283 285 288 293 296 298 302 303 305 311 314 323 332 335 340

Which International Standard	laboratory number
APC FDA/BAM Chapter 3	192
Coliforms enumeration ISO 4832:2006	018 059 096 106 108 131 150 153 156 176 188 208 214 216 263 265 296
Coliforms enumeration ISO 4831:2006	083 134 277
Coliforms enumeration AOAC 991.14	050 053 065 139 143 288
Enterobacteriaceae enumeration ISO 21528-1:2017	035 131 132 146 178 311
Enterobacteriaceae enumeration ISO 21528-2:2017	018 029 031 058 059 083 096 106 107 108 116 150 156 166 176 178 182 183 197 208 209 214 219 263 274 293 296 302 305
Escherichia coli enumeration ISO 16649-1:2018	035 083 096
Escherichia coli enumeration ISO 16649-2:2001	018 029 030 058 059 106 108 131 150 156 162 164 176 182 188 200 208 209 214 219 263 296
Escherichia coli enumeration ISO 16649-3:2015	134
Escherichia coli enumeration AOAC 991.14	050 053 139 143 241 288
Escherichia coli O157:H7 detection ISO 16654:2001	204
Afnot BRD-07/7-12/04	225
Amendment to the announcement of the No. 1021950329 of the Ministry of Food on September 6, 102 Methods of Test for Food Microorganisms-Test of Coliform bacteria	279
AOAC 2003.01	143
AOAC Method 991.14, AOAC Method 2003.01	275
CCFRA-2.2.1:2007	303
ChromoID Coli agar	017
CMMEF Chapter 8, APHA for Enterobacteriaceae	285
E. COLI ENUMERATION ISO 16649-2:2001	282
Enterobacteriaceae enumeration BRD 0724 1113	134
Enumeration of E. coli & Coliform Bacteria FDA/BAM Chapter 4	147
GB 4789.3-2016(The second method) GB4789.38-2012(The second method)	205
OMA # 998.08	148
TEMPO	081

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	001 017 024 029 031 035 041 042 050 053 058 059 076 081 083 093 096 108 116 131 132 134 139 143 146 147 148 153 162 164 178 182 183 184 189 192 196 197 200 208 209 214 219 230 237 262 263 277 280 281 282 290 293 296 298 302 311 314 323 325 332 335
Butterfield's Phosphate Buffer	181 241 268 274 279 285 288
Maximum Recovery Diluent (MRD)	030 106 107 150 156 188 265 283 303
Peptone Water	063 130 176 204 216 253
Phosphate Buffered Saline (PBS)	018 025 065 141 205 275
Ringer's Solution	078
Tryptone Water	305

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	024 041 081 083 096 106 107 131 132 139 148 183 184 196 197 200 268 274 281 290 293 323 335
Lauryl Tryptose Broth	076 237 277 279 280
Lauryl Sulphate Broth	147
Enterobacteriaceae use VRBG(Violet Red Bile Glucose);coliform$E.coli use VRB(Violet Red Bile)	065
Lauryl Sulphate Tryptose Broth	325
NaCl Pepton	296
No	205
Peptone water	035
VRBG agar	275

Which Secondary Enrichment Medium Used	laboratory number
Brilliant Green Bile Broth (BGBB)	076 277
Brilliant Green Bile Lactose Broth (BGLB)	063 141 205 237 274 279 280 281 325
Rappaport Vassiliadis Broth (RV)	323
BUFFER PEPTONE WATER	041
coliform& E. coli¼šBGIC(5-bromo-4-chloro-3indolyl-D-glucuronide);Enterobacteriaceae:terrazolium indicator	065
EC Broth	147
NA	197
Petrifilm EC	204

Plating Method Used	laboratory number
Pour plate	018 024 025 029 030 031 041 042 050 053 059 063 083 093 096 106 107 108 116 130 131 134 146 150 153 156 162 164 166 176 178 181 182 188 192 197 200 204 205 209 214 216 237 263 274 281 283 290 293 296 298 303 305 311 332 335
Spread plate	035 058 065 143 184 189 219 262 265 268 285 302
Overlay	017 078 132 183 196 241

Inoculum Volume (ml)	laboratory number
0.01	277
0.1	058 132 219 262 302
1.0	001 017 018 024 029 030 031 035 041 042 050 053 059 063 065 076 078 081 083 093 096 106 107 108 116 130 131 134 139 141 143 146 147 148 150 153 156 162 164 166 176 178 181 182 183 184 188 189 192 196 197 200 204 205 208 209 214 216 237 241 263 265 268 274 275 279 280 281 283 285 288 290 293 296 298 303 305 311 323 332 335

Alternative/Rapid Method	laboratory number
MOLDI-TOF	219
Most Probable Number - Tube	076 188 237
Most probable Number - Automated	041 156 230 282
Petrifilm (3M)	024 050 053 065 078 130 147 178 184 189 192 197 200 204 241 268 275 290 323
RapidChek	083

Incubation Temperature (°C)	laboratory number
30	219 283
35	024 053 063 065 076 083 093 139 143 148 181 192 237 241 268 274 275 279 280 281 285 288 325
37	017 030 031 041 050 078 096 106 107 108 116 130 132 141 146 147 150 153 156 166 178 182 183 184 188 189 196 197 200 204 205 209 214 216 225 230 262 263 265 277 282 290 293 296 298 302 303 305 323 332 335
42	035
44	029 162 164

Time Incubated (hours) Approximately	laboratory number
18	035 132
24	017 018 024 029 030 031 041 042 050 058 063 065 083 093 096 106 107 108 130 134 141 143 146 148 150 153 162 164 178 181 182 183 184 188 189 196 197 200 204 205 209 214 216 230 262 263 265 268 274 275 277 280 282 283 285 290 293 296 298 302 303 305 323
48	053 076 078 116 139 147 192 219 237 241 279 281 288 325 332 335
60	311

Confirmation of Organism's Identity	laboratory number
API 20E	181 274 303 305 335
beta-glucoronidase activity	065 181 188 282
Catalase reaction	192
Fermentation of Carbohydrates	017 018 050 150 166 181 182 183 188 197 204 209 216 263 293 311
IMViC test	076 141 147 150 192 200 280
Indole production	017 147 196 277
Morphology	024 116 205 214
Microbact 24E	150
Oxidase reaction	017 031 050 107 146 150 166 181 182 188 192 197 209 214 262 263 275 290 293 302
VITEK	156 192 237 281 285 323 332
Voges-Proskauer (VP) reaction	192

Selective/Chromogenic Medium Used for Enterobacteriaceae	laboratory number
Petrifilm (3M) Enterobacteriaceae	053 065 078 130 143 148 178 184 189 192 268
Violet Red Bile Agar (VRB)	063 108 200
Violet Red Bile Dextrose Agar (VRBD)	029 035 057 106 176 219 302 305
Violet Red Bile Glucose Agar (VRBG)	017 018 021 025 031 041 050 058 059 083 107 108 112 116 131 144 146 149 150 153 156 164 166 181 182 183 188 192 196 197 208 209 214 216 237 253 263 265 274 275 279 281 283 285 290 293 296 298 303 311 314 323 324 325 332
Rapid Enterobacteriaceae (Bio Rad)	162
RAPIDÂ€Â™ Enterobacteriaceae	134
Rebecca + EB	230
TBX	108

Selective/Chromogenic Medium Used for Coliforms	laboratory number
Brilliant Green Bile Broth (BGBB)	206 277 332
Brilliant Green Bile Lactose Broth (BGLB)	076 141 205 237 279 281 293 314 324 325
Chromocult Coliform Agar	200 285
Endo Agar	262
Lauryl Tryptose Broth	029 280
Petrifilm (3M) Colliforms	024 050 065 078 112 143 148 189 192 241 268 275 288 323
Violet Red Bile Agar (VRB)	021 025 041 042 063 106 107 108 141 144 146 149 156 181 192 196 206 208 274 303 305 311
Violet Red Bile Lactose Agar (VRBL)	018 031 059 116 131 134 150 153 164 176 188 214 216 253 263 265 283 296 298
Brilliance Coli	057
brilliant selective medium	083
Chromo ID Coli	017
Petrifilm (3M) E. Coli/Coliform Count Plate	147
Petrifilm (3M) E.coli/Coliform Count Plate	275
Rapid E. coli agar	178
VRBA	205

Selective/Chromogenic Medium Used for E. coli	laboratory number
Brilliance E.coli	200
Petrifilm (3M) Colliforms	024 050 065 078 093 143 148 241 288 323
Tryptone Bile Glucuronide Agar (TBX)	018 021 025 029 035 041 042 057 058 059 106 107 108 112 131 132 134 144 146 149 150 153 156 162 164 176 182 188 208 214 216 219 253 263 265 274 283 285 298 302 303 305
Tryptone Water	332
Eosine Methylene Blue Agar (EMB)	063 076 237 280 281 293 314 324
brilliant selective medium	083
Chromo ID Coli	017
coli ID	031
COLID (BIOMERIEUX)	209
Es Colimark	296
MUG Violet Red Bile Agar	206
Petrifilm (3M) E. Coli/Coliform Count Plate	147 275 268
petrifilm 3M SEC	189
Petrifilm E.coli, MacConkey broth	192
PetrifilmTM Selectivo para E.Coli	130
Rapid E. coli agar	178
Violet Red Bile Agar	196
VRBA,VRBA-MUG	205
VRBA-MUG and VRBA	141

Enumeration of Aerobic Plate Count in Chicken

Accredited Method Used	laboratory number
no	030 042 052 109 115 181 214
yes	004 006 019 025 036 038 073 081 084 088 112 125 130 138 139 154 159 160 162 166 174 189 192 194 206 225 226 228 230 238 241 246 251 255 262 265 277 303 306 307 311 340

Method Based on an International Standard	laboratory number
no	004 036 042 073 130 159 228 230 251 262 306 307
yes	006 019 025 030 038 052 081 084 088 109 112 115 125 138 139 154 160 162 174 181 189 192 194 206 214 225 226 238 241 246 255 265 277 303 311 340

Which International Standard	laboratory number
APC (pour plate) ISO 4833-1:2013	030 038 052 084 109 112 115 154 160 166 194 214 246 255 265 277
APC (spread plate) ISO 4833-2:2013	174 189
APC ISO 4833:2003	125
APC FDA/BAM Chapter 3	006 088 139 181 192 206 311
APC AOAC 990.12	138 238 241
GOST 10444.15-94	251
iso 4833-1	225
ISO 4833-1:2013	162
NCh 2659	307
USFDA BAM Chapter-3,CCFRA-1.1.1:2007	303

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	004 006 019 036 038 042 052 084 088 109 112 115 125 139 154 162 174 189 192 194 214 230 238 246 255 262 277 306 307 311
Butterfield's Phosphate Buffer	181 241
Maximum Recovery Diluent (MRD)	030 138 160 265 303
Peptone Water	073 159 226 228 251
Phosphate Buffered Saline (PBS)	025
Ringer's Solution	206
Tryptone Water	130

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	006 125 138 139 238 255 306 307
none	038
Plate Count Agar	088
The physical solution	073

Which Secondary Enrichment Medium Used	laboratory number
AC TEMPO	125
BPW	307
Not Applicable	088
PC-Agar	038
There is no secondary enrichment in this technique	073

Plating Method Used	laboratory number
Pour plate	006 019 025 030 036 038 042 052 073 084 088 109 112 115 125 130 139 154 159 160 162 166 174 181 192 194 206 214 226 238 246 251 255 262 265 277 303 311
Spread plate	138 189 306 307
Overlay	241

Inoculum Volume (ml)	laboratory number
0.1	004 125
1.0	006 019 030 036 038 042 052 073 084 088 109 112 115 130 138 139 154 159 160 162 166 174 181 189 192 194 206 214 226 228 241 246 251 255 262 265 277 303 306 307 311

Alternative/Rapid Method	laboratory number
Most probable Number - Automated	004 125 230
Petrifilm (3M)	073 130 138 159 192 228 238 241

Incubation Temperature (°C)	laboratory number
30	004 030 038 042 052 073 084 109 112 115 125 130 154 159 160 162 166 174 189 194 214 226 230 246 251 255 262 265 277 306
35	006 088 138 139 181 192 228 241 303 307 311
37	019 025 036 206 238 340

Time Incubated (hours) Approximately	laboratory number
24	230
48	004 006 019 036 042 088 125 138 139 174 181 192 206 228 238 241 303 307 311 340
60	025 038 073 084 112 130 159 160 162 166 189 214 251 255 262 265 277 306

Confirmation of Organism's Identity	laboratory number
API RapidID 20E	246
Morphology	038
Microscopy	073

Selective/Chromogenic Medium Used	laboratory number
Petrifilm (3M) Aerobic Plate Count	130 138 159 192 228 238 241
Plate Count Agar (PCA)	006 019 025 036 038 042 052 073 084 088 109 139 160 162 166 174 181 192 194 206 214 226 246 251 255 262 265 277 303 306 307 311
AC TEMPO	125

Enumeration of *Campylobacter* spp. in Chicken

Accredited Method Used	laboratory number
no	034 040 085 097 153 154 188 269
yes	008 057 082 111 126 152 160 179 186 202 213 219 227 261 267 285 288 289 294 307 326 327 335 339 341

Method Based on an International Standard	laboratory number
no	034 307
yes	008 040 082 085 097 111 126 152 153 154 160 179 186 188 202 213 219 227 261 267 269 285 288 289 294 326 327 335 339 341

Which International Standard	laboratory number
Campylobacter spp. detection ISO 10272-1:2017	111 339
Campylobacter spp. detection ISO 10272-2:2017	040 057 082 085 097 126 152 153 154 160 179 186 188 202 213 219 227 261 267 285 288 289 294 326 335 341
ASU L00.00-107 2007-04 Horizontales Verfahren zum Nachweis und zur ZÃ¤hlung von Campylobacter spp. in Lebensmitteln	327
FSIS USDA 41	008
ISO 10272-2	269
Rapid Campylobacter	034

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	008 040 085 097 111 126 153 154 188 202 213 219 227 267 269 289 326 327 335 339 341
Maximum Recovery Diluent (MRD)	082 160 186 261 285 294
Peptone Water	034 152 179

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	085 202 294 339 341
Bolton	057
Campyfood	307
n/a	152
no	335
Peptone Salt Diluent	289

Which Secondary Enrichment Medium Used	laboratory number
Bolton Broth	008 202
Campyfood	307
CCDA	327
no	335

Plating Method Used	laboratory number
Pour plate	097 154
Spread plate	008 034 040 057 082 085 111 126 152 153 160 179 186 188 202 213 219 261 267 269 285 288 289 294 326 327 335 339 341
Overlay	227

Inoculum Volume (ml)	laboratory number
0.1	008 034 040 057 082 097 111 126 153 179 188 213 219 267 285 294 327 335 341
0.5	326 339
1.0	085 152 154 160 186 202 227 261 269 288 289

Alternative/Rapid Method	laboratory number
MOLDI-TOF	219
Most probable Number - Automated (e.g. TEMPO)	186
PCR	261 307

Incubation Temperature (°C)	laboratory number
37	307
41.5	034 040 082 085 097 126 152 153 154 160 179 186 188 202 213 219 227 261 267 269 288 289 294 326 327 335 339 341
42	008 057 111 285

Time Incubated (hours) Approximately	laboratory number
48	008 034 040 057 082 085 097 111 126 152 153 154 160 179 186 188 202 213 219 227 261 267 269 285 288 289 294 307 326 327 335 339 341

Confirmation of Organism's Identity	laboratory number
API Campy	160 285
Catalase reaction	202 227
DNase test	126
Haemolysis	288
Hippurate Hydrolysis	111 202
Latex slide agglutination	008 034 057 097 154 267 326
Morphology	085 126 152 188 261 269
Microscopy	040 126 186 288
Motility	082 126 152 188 213 261 288 289 294
Oxidase reaction	082 126 152 186 188 202 261 288 327 335
Serological agglutination test	153
PCR	261 307

Selective/Chromogenic Medium Used	laboratory number
Campyfood Agar	267
Campylobacter selective blood free agar (CCDA)	111 152 179 213 294 339 341
Modified Campylobacter selective blood free agar (mCCDA)	040 082 085 097 153 160 186 188 202 227 261 269 285 288 289 326 327
Karmali Agar	057
Campyfood broth	307
CASA (Biomerieux)	219
Rapid Campy Agar	285
Rapid Campylobacter	034

Enumeration of Yeast and Moulds in Flour

Accredited Method Used	laboratory number
no	046 066 096 119 123 137 143 206 216 254 283 284 287 298 309 322
yes	027 028 031 045 063 068 081 090 091 092 095 099 100 103 144 159 160 163 169 173 185 191 193 198 201 218 227 234 239 241 242 243 251 259 260 277 286 291 303 310 342

Method Based on an International Standard	laboratory number
no	092 119 123 137 163 169 185 251
yes	027 028 031 045 046 063 066 068 081 090 091 095 096 099 100 103 143 144 159 160 173 191 193 198 201 206 216 218 227 234 239 241 242 243 254 259 260 277 283 284 286 287 291 298 303 309 310 322 342

Which International Standard	laboratory number
APC (spread plate) ISO 4833-2:2013	027
Vibrio parahaemolyticus detection ISO 21872-1:2017	241
Yeasts and Moulds (sum) enumeration (high water availability) ISO 21527-1:2008	227 283 322
Yeasts and Moulds (sum) enumeration (low water availability) ISO 21527-2:2008	045 063 090 091 095 096 100 144 159 160 173 191 193 216 218 242 254 277 284 286 310 342
Australian Standards AS 1766.2.2 1997, Method 2.2 Food Microbiology	234
AOAC 997.02	143
FDA-BAM	028
GOST 10444.12-2013	251
ISO 6611:2008	099
KFDA	291
Microbiology of food and animal feeding stuffs. Methods for the detection and colony count of yeasts and moulds	201
NF 3M 01/13-07/14	046
SNI 2973:2011 - Biscuit	287
Yeast and Moulds FDA/BAM Chapter 18	309
Yeast&Molds FDA/BAM Chapter 18	259

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	027 028 031 090 091 096 100 123 143 191 193 218 227 239 242 284 287 298 309 310 322
Butterfield's Phosphate Buffer	103 198 241 259
Maximum Recovery Diluent (MRD)	046 119 160 260 283 303
Peptone Water	045 063 066 068 099 159 173 201 206 216 234 243 251 254 277 342
Phosphate Buffered Saline (PBS)	092 169 291
Ringer's Solution	095 137

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	066 090 091 096 099 173 191 193 239 242 284 322 342
Enterobacteriaceae Enrichment broth (EE)	063
Tryptone Soya Broth	169
DG18	234
DRBC & DG 18	028
Modified letheen broth	027
No Enrichment	309
No pre enrichment	259
Peptone water	045
Sabouraud Agar	201

Which Secondary Enrichment Medium Used	laboratory number
Brilliant Green Bile Lactose Broth (BGLB)	066
Modified letheen broth	027
No Enrichment	309
No secondary enrichment	259

Plating Method Used	laboratory number
Pour plate	066 092 096 099 103 123 159 163 185 201 227 239 242 251 259 287 291 298 309 322
Spread plate	027 028 031 045 063 090 091 095 100 119 137 143 160 173 191 193 198 206 216 218 234 241 243 254 277 283 284 303 310
Overlay	046

Inoculum Volume (ml)	laboratory number
0.001	046
0.01	185
0.05	027
0.1	028 031 045 090 091 096 100 119 191 193 206 216 218 234 241 243 254 277 284 303 322 342
0.5	095
1.0	063 066 068 092 099 103 123 137 143 159 160 163 169 173 198 201 227 239 242 251 259 283 287 291 298 309 310

Alternative/Rapid Method	laboratory number
Petrifilm (3M)	027 046 068 092 123 137 159 163 193 198 239

Incubation Temperature (°C)	laboratory number
22	241
25	027 028 031 045 046 063 066 068 090 091 095 096 099 100 103 119 123 137 143 144 159 160 163 173 185 191 193 198 201 206 216 218 227 234 239 242 243 251 254 259 277 283 284 287 291 298 303 309 310 322 342
30	169

Time Incubated (hours) Approximately	laboratory number
60	027 028 031 045 066 068 096 099 100 123 137 159 169 173 191 193 218 227 234 239 251 277 284 291 303 309 310

Confirmation of Organism's Identity	laboratory number
Morphology	119 159 173 201 234 259 277
Microscopy	095 193 201 206 216 218 227 303
PCR	027 066
VITEK	169 239

Selective/Chromogenic Medium Used	laboratory number
Dichloran 18% Glycerol Agar (DG18)	028 045 090 091 095 099 100 160 193 206 216 218 234 239 242 277 283 284 286 310 342
Dichloran Rose-Bengal Chloramphenicol Agar (DRBC)	028 066 163 169 185 206 227 251 298 303 322
Petrifilm (3M) Yeasts & Moulds	068 137 143 159
Potato Dextrose Agar (PDA)	063 092 103 173 241 291
Yeast Glucose Chloramphenicol Agar (YGC)	031 143 159 259 287 309
3M Petrifilm Rapid Yeast and Mold Count plate	046
chloramphenicol Added Sabouraud dextrose agar	027
OGYEA	119
Sabouraud Agar	201

Detection of *Listeria monocytogenes* /*Listeria* spp. in Chicken

Accredited Method Used	laboratory number
no	003 060 171 214 270 304
yes	006 054 055 056 108 125 126 129 130 136 160 162 172 199 226 228 244 246 249 306 319

Method Based on an International Standard	laboratory number
no	130 136 171 199 214 228 244 304
yes	003 006 054 055 056 060 108 125 126 129 160 162 172 226 246 249 270 306 319

Which International Standard	laboratory number
Listeria monocytogenes detection ISO 11290-1:2017	003 054 055 056 060 108 125 126 129 160 162 172 246 249 306 319
Listeria monocytogenes enumeration ISO 11290-2:2017	006
Food safety national standard food microbiology test for listeria monocytogenes GB 4789.30-2016	199

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	003 056 108 125 130 136 172 199 226 244 246 249 270 306
Half Fraser Broth	006 054 055 129 160 162 319
Maximum Recovery Diluent (MRD)	060
Peptone Water	304

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	306
Fraser Broth	006
Half Fraser Broth	003 054 056 108 126 129 130 160 226 246 249 319
Listeria Enrichment Broth 1 (LEB)	055 060 136 171 172 199 244 270
LMX	125
LX Broth	228

Which Secondary Enrichment Medium Used	laboratory number
Fraser Broth	003 006 054 056 108 126 129 130 160 246 249 306 319
COMPASS listeria	162
listeria Enrichment Broth 2(LEB)	172
Listeria Enrichment Broth2	199
LX Broth	228

Plating Method Used	laboratory number
Pour plate	172
Spread plate	003 006 055 056 125 129 136 162 171 214 226 244 246 249 306 319
Overlay	060 108

Inoculum Volume (ml)	laboratory number
0.01	125 136 172 214 244
0.1	003 006 055 056 108 129 162 199 226 249 306
0.5	060
1.0	319
>2.0	246

Alternative/Rapid Method	laboratory number
Impedance	249
MOLDI-TOF	319
PCR	055 214 244 270
VIDAS (ELFA)	006 056 108 125 130 228
miniVIDAS (ELFA)	060 304 306

Incubation Temperature (°C)	laboratory number
30	003 055 126 129 130 160 162 171 199 228 244
35	006 136 270
37	056 060 108 172 214 226 246 249 304 306 319
41.5	125

Time Incubated (hours) Approximately	laboratory number
24	003 006 055 060 108 125 126 129 130 136 160 199 214 226 244 249 304
48	056 162 171 172 228 246 270 306 319

Confirmation of Organism's Identity	laboratory number
API Listeria	160 214 228 304 306
CAMP test	056 126 319
Catalase reaction	199 226 228 306
Coagulase reaction - slide test	126
Fermentation of Carbohydrates	108 126 228 270
Haemolysis	003 108 126 199 228 306
Morphology	199 214 228 306
Microscopy	054 199 226 306
Motility	199 226 228
PCR	055 125
VITEK	060 108 129 136 172 244 249
Voges-Proskauer (VP) reaction	199 226

Selective/Chromogenic Medium Used	laboratory number
Agar Listeria Ottavani Agosti (ALOA)	006 054 108 125 129 130 160 172 214 283 306 319
PALCAM Agar	172 199 244 270 306
Chromogenic Listeria Agar (Oxoid)	136 199
Ottavani Agosti Agar (OAA)	246
Oxford Agar	003 228
Brilliance Listeria Agar (OCLA)	056 249
Rapid L. mono	055 228
COMPASS Listeria (Biokar)	162

Detection of *Escherichia coli* O157:H7 in Sprouting Seeds and Lettuce

Accredited Method Used	laboratory number
no	153 257
yes	012 077 122 131 192 231 340

Method Based on an International Standard	laboratory number
no	122
yes	012 077 131 153 192 231 257 340

Which International Standard	laboratory number
Escherichia coli O157:H7 detection ISO 16654:2001	077 131 153 257
Escherichia coli O157:H7 detection ISO/TS 13136:2012 (PCR)	231
FDA/BAM CHAPTER 4	192

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	012 077 122 153 192
Tryptone Water	257

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	012 153
Tryptone Soya Broth	257
E.Coli ,Modified	122
EC Broth	077
MP Media	192

Which Secondary Enrichment Medium Used	laboratory number
MacConkey	257

Plating Method Used	laboratory number
Spread plate	122 153 192 257

Inoculum Volume (ml)	laboratory number
0.01	122 192
0.05	153
0.1	012 257

Alternative/Rapid Method	laboratory number
Loop Mediated Isothermal Amplification (LAMP)	012
PCR	122 192
miniVIDAS (ELFA)	153

Incubation Temperature (°C)	laboratory number
37	012 077 122 153 340
41.5	257
42	192

Time Incubated (hours) Approximately	laboratory number
18	257
24	012 077 122 153 192

Confirmation of Organism's Identity	laboratory number
API 20E	012 122
IMViC test	192
Indole production	257
Lysine Decarboxylase	192
Serological agglutination test	077 153
PCR	192
VITEK	192
Triple Sugar Iron Agar (TSI)	192

Detection of *Listeria monocytogenes* /*Listeria* spp. in Mixed Vegetables

Accredited Method Used	laboratory number
no	033 133 165 210 214 215 257 272 313
yes	015 016 044 087 094 152 161 176 182 207 230 232 233 235 276 306 338

Method Based on an International Standard	laboratory number
no	016 161 214 230 276 313 338
yes	015 033 044 087 094 133 152 165 176 182 207 210 215 232 233 235 257 272 306

Which International Standard	laboratory number
Listeria monocytogenes detection ISO 11290-1:2017	015 033 087 152 176 182 207 215 257 272 306 338
AOAC 2016.07	232 233
AOAC 2016.07/ISO11290:2017	133
ASU L 00.00-32/1	044
KFDA listeria monocytogenes detection	094
KFDA method .8.4.15	313

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	015 016 152 182 272 276 306 313
Half Fraser Broth	033 044 087 133 161 165 215 232 233 257
Phosphate Buffered Saline (PBS)	094

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	094 306
Fraser Broth	033 044 215
Half Fraser Broth	015 016 087 133 161 176 182 207 232 233 257 272
Lauryl Tryptose Broth	338
Listeria Enrichment Broth 1 (LEB)	210 276 313
LMX broth	152
LPT	230

Which Secondary Enrichment Medium Used	laboratory number
Fraser Broth	015 087 133 176 182 207 215 230 232 233 257 272
-	033
no secondary enrichment	044
not used	313

Plating Method Used	laboratory number
Spread plate	033 044 087 094 152 161 165 214 215 257 272 276 306 313

Inoculum Volume (ml)	laboratory number
0.01	033 094 165 214 272
0.1	087 152 161 215 257 276 306
>2.0	313

Alternative/Rapid Method	laboratory number
Loop Mediated Isothermal Amplification (LAMP)	133
MOLDI-TOF	094
PCR	016 087 210 214 230 338
VIDAS (ELFA)	152 165
miniVIDAS (ELFA)	306

Incubation Temperature (°C)	laboratory number
30	016 094 207 276 313
37	015 033 044 087 133 152 161 165 182 210 214 215 230 232 233 257 272 306 338

Time Incubated (hours) Approximately	laboratory number
24	015 016 133 152 165 207 210 214 230 272 338
48	033 044 087 094 161 182 215 257 306 313

Confirmation of Organism's Identity	laboratory number
Aesculin hydrolysis	033
API Listeria	165 182 214 215 276 306
CAMP test	182 207 272
Catalase reaction	033 133 182 207 272 306
Fermentation of Carbohydrates	033 133 182 272
Haemolysis	033 133 182 207 257 272 306
Morphology	182 207 214 272 306
Microscopy	133 182 272 306
Motility	133 207 272
Microbact 12B	087 087
Microbact 12E	044
Oxidase reaction	033
PCR	016 230
VITEK	094 313
Voges-Proskauer (VP) reaction	272

Selective/Chromogenic Medium Used	laboratory number
Agar Listeria Ottavani Agosti (ALOA)	033 087 133 165 176 182 207 214 215 230 232 272 306 338
PALCAM Agar	015 033 207 232 306
Chromogenic Listeria Agar (Oxoid)	015
Oxford Agar	094 133 182 272 276 313
Brilliance Listeria Agar (OCLA)	210
Rapid L. mono	152 322

Detection of *Salmonella* spp. in Ground Pepper

Accredited Method Used	laboratory number
no	062 168 180 214 215 300
yes	047 069 085 102 114 157 158 166 192 195 252 278 283 303 328

Method Based on an International Standard	laboratory number
no	214
yes	047 062 069 085 102 114 157 158 168 180 192 195 215 252 278 283 300 303 328

Which International Standard	laboratory number
Salmonella spp. detection ISO 6579-1:2017	085 102 114 157 166 168 195 215 252 283 300 328
Salmonella spp. detection FDA/BAM Chapter 5	047 158 180 192 278
CCFRA-3.1.2:2007,3.1.5:2007	303
Korea Food Code	069

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	062 085 102 114 157 168 215 278 283 300
Butterfield's Phosphate Buffer	047

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	062 069 085 102 114 166 195 214 300 303
Mueller Kauffman Tetrathionate Novobiocin Broth (MKKTn)	157 168
Rappaport Vassiliadis Broth (RV)	215 278 283
Tryptone Soya Broth	047 158 180
0.5% potassium sulphite BPW	328
0.5% Potassium Sulphite Buffer Peptone Water	252
Trypticase soy broth	192

Which Secondary Enrichment Medium Used	laboratory number
Rappaport Vassiliadis Broth (RV)	047 085 157 158 166 180 215 328
Rappaport Vassiliadis Soya Peptone(RVS)	062 114 168 195 303
Selenite Cysteine Broth	062
Tetrathionate Broth	047 158 166 192 278 303
MKTTn, MSRV	195
MSRV	192
Rappaport-vassiliadis soya broth and Muller-Kauffmann Tetrathionate Novobiocin broth	252
RVS + Tetrathionate Broth	069
xylose lysine deoxycholate agar	283

Plating Method Used	laboratory number
Pour plate	157
Spread plate	062 102 114 158 180 192 214 215 278 283
Overlay	069

Inoculum Volume (ml)	laboratory number
0.01	047 062 069 114 158 180 192 214 278
0.1	085 102 195 215 283
1.0	157

Alternative/Rapid Method	laboratory number
Enzyme Immunoassay	278
MOLDI-TOF	069
PCR	114 192 214
RapidChek	102 328

Incubation Temperature (°C)	laboratory number
35	047 069 180 192
37	062 085 102 114 157 158 168 195 214 215 252 278 300 303 328
42	283

Time Incubated (hours) Approximately	laboratory number
18	114 195 300
24	047 069 085 168 180 192 214 283 303 328
48	062 102 157 158 215 278

Confirmation of Organism's Identity	laboratory number
API 20E	047 062 085 166 168 215 252 303 328
Enterotube (BBL)	195
Fermentation of Carbohydrates	158
IMViC test	158 278
Latex slide agglutination	180 214
Lysine Decarboxylase	158 278
Lysine Iron Agar	158 192 278
Morphology	195 214
Microscopy	062 158 278
Motility	278
Microbact 24E	283
Oxidase reaction	166 195
Serological agglutination test	158 278
PCR	069 114
VITEK	192
Voges-Proskauer (VP) reaction	158 278
Triple Sugar Iron Agar (TSI)	157 158 166 180 192 278

Selective/Chromogenic Medium Used	laboratory number
Xylose Lysine Desoxycholate Agar (XLD)	283

Detection of *Vibrio parahaemolyticus* in Fish

Accredited Method Used	laboratory number
no	064 079 085 175 181 187 271 312 338
yes	005 012 013 020 049 050 067 070 074 089 098 101 106 118 120 132 138 140 146 155 167 170 174 192 201 227 240 245 246 265 273 278 285 303 315 316 320 321 334 340

Method Based on an International Standard	laboratory number
no	013 049 050 140 175 187 201 240 245 271 312 316 320 338
yes	005 012 020 064 067 070 074 079 085 089 098 101 106 118 120 132 138 146 155 167 170 174 181 192 227 246 265 273 278 285 303 315 321 334 340

Which International Standard	laboratory number
Vibrio parahaemolyticus detection ISO 21872-1:2017	005 012 020 064 067 074 079 085 089 101 106 118 132 138 146 167 170 181 227 265 273 278
CCFRA-3.8.1:2007	303
ISO/TS 21872-1-2013	246
FDA BAM Chapter 9	285
FDA BAM, Chapter 9	155
GB 4789.7-2013	049 120
GB 47893.7-2013	140
KFDA method .8.4.13	312
Methodological guidelines on control methods. Methods of detecting and determining parahemolytic vibrions in fish, non-fish objects, products produced from them, water of surface water bodies and other objects 4.2.2046-06	201
SNI 01-2332.5-2006	320
Standard Methods of Analysis in Food Safety Regulation 2015	315
Vibrio FDA BAM Chapter 9	098
Vibrio parahaemolyticus SNI 01 2332.5-2006	240

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	020 070 118 167 246 265 273 338
Peptone Water	005 074 079 120 138 201 240 271 278 285 315 316
Phosphate Buffered Saline (PBS)	050 064 132 170 245 320 334

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	070 098 245 273
1 % peptone water with 3% sodium chloride	201
3% sodium chloride basic peptone water	120
3%NaCl APW	049
ABPW	338
alkaline buffered peptone water	118
Alkaline Peptone Salt	320
Alkaline Peptone Water	155 170 285
alkaline saline Peptone water	146
Alkaline saline peptone water	278
Alkaline Saline Peptone Water (ASPW)	138
APW	181
ASPW	303
Pepton water with 2% NaCl	020
TCBS; SNA	174
VEB Bio-Rad	132

Which Secondary Enrichment Medium Used	laboratory number
Rappaport Vassiliadis Soya Peptone(RVS)	070
alkaline buffered peptone water	118
Alkaline Peptone Water	170
alkaline saline Peptone water	146
alkaline saline peptone water	278
Alkaline Saline Peptone Water (ASPW)	138
no	316
TCBS Agar	201

Plating Method Used	laboratory number
Pour plate	005 118 174 245
Spread plate	013 020 064 067 074 138 140 146 170 181 192 240 246 265 271 273 278 312 338
Overlay	106 120 201 227 316 334

Inoculum Volume (ml)	laboratory number
0.001	049 120 271
0.01	005 106 146 192 201 227 312 334
0.05	316
0.1	012 020 067 118 181 265
1.0	050 074 085 138 170 174 240 245 273 320 321 338
>2.0	246

Alternative/Rapid Method	laboratory number
MOLDI-TOF	245
PCR	049 050 067 074 120 132 138 140 167 170 181 273 320 338
RapidChek	005

Incubation Temperature (°C)	laboratory number
30	118
35	012 020 050 074 098 155 170 175 181 192 273 285 316 334
37	005 013 064 067 070 085 089 101 106 120 140 146 174 187 201 227 240 245 246 265 271 278 312 315 320 321 338
41.5	079 132 138 167
42	303

Time Incubated (hours) Approximately	laboratory number
18	013 120 132 138 140 181 273 315 320
24	005 012 020 049 050 064 067 070 074 079 085 098 101 106 146 155 167 170 174 175 187 192 201 227 240 245 265 271 278 285 303 312 316 321 334 338
48	118 246

Confirmation of Organism's Identity	laboratory number
API 20E	012 049 064 079 085 089 098 106 155 175 321
API 20 NE	303
beta-Galactosidase	138 201
Fermentation of Carbohydrates	201
IMViC test	278
Indole production	138 174 201 315
Lysine Decarboxylase	138 201 271 278 315
Morphology	201 245 273
Microscopy	098 201 278
Motility	138 201 315
Nitrate/nitrite reduction	201
Ornithine decarboxylase	138 201 278
Oxidase reaction	098 138 146 174 192 201 227 278 315
Salt tolerance	098 138 192 201 240 271 278 315
PCR	050 132 138 167 170 181
VITEK	005 020 067 074 118 120 140 192 285 312 316
Voges-Proskauer (VP) reaction	138 201 271 278 315
Triple Sugar Iron Agar (TSI)	013 138 192 201 271 315 320

Selective/Chromogenic Medium Used	laboratory number
Thiosulfate Citrate Bile Salts Sucrose (TCBS)	012 013 020 050 064 070 074 085 089 098 105 106 118 128 138 140 146 155 170 174 187 201 265 271 278 285 303 312 315 316 320 334
TCBS + 2% NaCL	067 175 240 246 285
TCBS + 3% NaCL	005 011 120 245 273
KLIGLER agar	201
CHROMagar Vibrio	049 085 132 181 192 278 285 321
AGS Slant	285

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 (PDF file), of proficiency tests in which they have participated.
- View charts of their z-scores obtained in previous Fapas® – Food Microbiology proficiency tests

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 Stilian Hristov (Round Coordinator). Participants with any comments or concerns about this proficiency test should contact:

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