



Fapas[®] – Food Microbiology Proficiency Test Report 220

March 2017

PARTICIPANT LABORATORY NUMBER

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SUMMARY

1. The test material for Fapas[®] – Food Microbiology distribution 220 was dispatched in February 2017. Test materials for seven proficiency tests were available in this distribution:

M220e13	Aerobic Plate Count and Enumeration of <i>Bacillus cereus</i> (equivalent to 10 g of beef)
M220e18	Enumeration of Coliforms (equivalent to 10 g of milk powder)
M220d20	Detection of <i>Cronobacter sakazakii</i> (equivalent to <u>10</u> g of infant formula X 2)
M220d02	Detection of <i>L. monocytogenes</i> / <i>Listeria</i> spp. (sponge swab X 2)
M220d071	Detection of <i>Salmonella</i> spp. (equivalent to 25 g chicken x 2)
M220d072	Detection of <i>Salmonella</i> spp. (sponge swab x 2).

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 $\log_{10}\text{cfu/g}$	number of scores, $ z \leq 2$	total number of scores	% $ z \leq 2$
enumeration of <i>B. cereus</i> in beef	4.83	28	29	97
aerobic plate count in beef	4.91	26	29	90
enumeration of coliforms in milk powder	3.97	29	45	64

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 <i>Cronobacter sakazakii</i> in infant formula	test material A detected test material B not detected	32	41	78	20	5
detection of <i>L. monocytogenes</i> on sponge swab	test material A not detected test material B detected	60	61	98	3	0
detection of <i>Listeria</i> spp. on sponge swab	test material A not detected test material B detected	40	45	89	11	0
detection of <i>Salmonella</i> spp. in chicken	test material A not detected test material B detected	48	48	100	0	0
detection of <i>Salmonella</i> spp. on sponge swab	test material A detected test material B not detected	54	59	92	3	7

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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 [3, 4].

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 [2].

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°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 [2].

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 27 February 2017. Test materials were sent to 207 participants.

2.4. Storage and Preparation Instructions

Instructions regarding sample storage and preparation are freely available on the Fapas[®] web site [5].

3. RESULTS

The instructions for reporting results were as follows:

- Start the analysis between 27 February 2017 and 8 March 2017.
- The results for enumeration tests must be reported as cfu/g.
- The results for M220d02 and M220d072 must be reported as detected/not detected per swab (in English). The results for M220d20 must be reported as detected/not detected in 10 g (in English), and the results for M220d071 must be reported as detected/not detected in 25g (in English). Please note that you must use the same method for both samples A and B.

Results were submitted by 198 participants (96%) before the closing date for this test, 20 March 2017.

Each participant was given a laboratory number, assigned in order of receipt of results. The reported results are given in Table 1 to Table 6.

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 [6] for each result. The procedure is detailed in the relevant protocols [3, 4].

Further background on the procedure followed can be found in the IUPAC International Harmonised Protocol for the Proficiency Testing of Analytical Chemistry Laboratories [7].

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 enumeration of *B. cereus* and the aerobic plate count this procedure was straightforward and the robust mean was chosen as the assigned value.

For the enumeration of coliforms results submitted by participants was not normally distributed. A bump hunt [8] showed the distribution to be bi-modal. The major mode at $3.97 \log_{10}$ cfu/g was considered to be the most appropriate measure of the consensus and was therefore set as the assigned value for this examination. A kernel density plot of the results submitted is inserted into Figure 3.

The assigned values for the proficiency tests in enumeration are shown in Table 7.

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.

The value for σ_p used to calculate z-scores from the results reported for the enumeration tests is given in Table 7.

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 2 and shown as histograms in Figure 1 to Figure 3. The number and percentage of z-scores in the range $-2 \leq z \leq 2$ for the enumeration tests are given in Table 8.

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 7.

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 3 to Table 6.

Intended results for these detection tests are shown in Table 9.

The number and percentage of satisfactory assessments are given in Table 10.

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 [7].

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 Certified Document Services, <https://helpx.adobe.com/acrobat/kb/certificate-signatures.html>, accessed 10/03/2017.
- 2 ISO/IEC 17043:2010, Conformity assessment – General requirements for proficiency testing.
- 3 Fapas[®], 2016, Protocol for Proficiency Testing Schemes, Part 1 – Common Principles, Version 5, Issued September 2016.
- 4 Fapas[®], 2016, Protocol for Proficiency Testing Schemes, Part 3 – Fapas[®] – Food Microbiology, Version 4, Issued September 2016.
- 5 Fapas[®] safety data sheet and preparation instructions, <http://fapas.com/useful-information/Technical-Documents.cfm>, accessed 10/01/2016.
- 6 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.
- 7 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.
- 8 Lowthian, P.J. and Thompson, M., 2002, Bump-hunting for the proficiency tester – searching for multimodality, *Analyst*, **127**, 1359-1364.

Table 1: Results and z-Scores for *B. cereus* and Aerobic Plate Count in Beef

laboratory number	<i>B. cereus</i>			aerobic plate count		
	assigned value 4.83 log ₁₀ cfu/g			assigned value 4.91 log ₁₀ cfu/g		
	result, cfu/g	result, log ₁₀ cfu/g	z-score	result, cfu/g	result, log ₁₀ cfu/g	z-score
002	78000	4.892	0.3	78000	4.892	-0.1
003	73000	4.863	0.1	78000	4.892	-0.1
012				1.4E+5	5.146	0.9
014	71800	4.856	0.1	105000	5.021	0.4
015	81.2E+3	4.910	0.3	82.4E+3	4.916	0.0
017				2.0E+4	4.301	-2.4
021	84000	4.924	0.4	76000	4.881	-0.1
028	6.59E+4	4.819	0.0	7.14E+4	4.854	-0.2
036	54000	4.732	-0.4	80000	4.903	0.0
042				1.4E+6	6.146	4.9
046	1.5E+4	4.176	-2.6	1.3E+5	5.114	0.8
051	1.0E+5	5.000	0.7	1.1E+5	5.041	0.5

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

Table 1 (continued): Results and z-Scores for *B. cereus* and Aerobic Plate Count in Beef

laboratory number	<i>B. cereus</i>			aerobic plate count		
	assigned value 4.83 log ₁₀ cfu/g			assigned value 4.91 log ₁₀ cfu/g		
	result, cfu/g	result, log ₁₀ cfu/g	z-score	result, cfu/g	result, log ₁₀ cfu/g	z-score
052	7.05E+4	4.848	0.1	8.05E+4	4.906	0.0
054				8.3E+4	4.919	0.0
059	6.3E+4	4.799	-0.1	6.3E+4	4.799	-0.5
062	4.1E+4	4.613	-0.9	9.6E+4	4.982	0.3
064				8.4E+4	4.924	0.0
075	8.0E+4	4.903	0.3	1.1E+5	5.041	0.5
078	61000	4.785	-0.2	50000	4.699	-0.9
083	* 7.7E+4	4.886	0.2	8.8E+4	4.944	0.1
091	59000	4.771	-0.2	84000	4.924	0.0
092	5.5E+4	4.740	-0.3	6.9E+4	4.839	-0.3
093	40000	4.602	-0.9			
094	1.5E+5	5.176	1.4			

* tested outside of the time frame recommended for analysis

Table 1 (continued): Results and z-Scores for *B. cereus* and Aerobic Plate Count in Beef

laboratory number	<i>B. cereus</i>			aerobic plate count			
	assigned value 4.83 log ₁₀ cfu/g			assigned value 4.91 log ₁₀ cfu/g			
	result, cfu/g	result, log ₁₀ cfu/g	z-score	result, cfu/g	result, log ₁₀ cfu/g	z-score	
103	8.2E+4	4.914	0.3	9.9E+4	4.996	0.3	
138	*	6.5E+4	4.813	-0.1			
139	*	2.82E+4	4.450	-1.5			
149		105000	5.021	0.8	59545	4.775	-0.6
167		84000	4.924	0.4			
172		65000	4.813	-0.1	75000	4.875	-0.1
174		35500	4.550	-1.1	43650	4.640	-1.1
178		8.9E+4	4.949	0.5	9.2E+4	4.964	0.2
181	*	5.75E+4	4.760	-0.3			
187		9.3E+4	4.968	0.6	6.1E+4	4.785	-0.5
195					3.0E+9	9.477	18.3

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

* tested outside of the time frame recommended for analysis

Table 2: Results and z-Scores for Coliforms in Milk Powder

laboratory number	coliforms				
	assigned value 3.97 log ₁₀ cfu/g				
	result, cfu/g	result, log ₁₀ cfu/g	z-score	most probable number technique used †	
001	2.7E+3	3.431	-2.2	No	
004	1.2E+4	4.079	0.4	No	
005	7.6E+3	3.881	-0.4	NO	
006	3.1E+3	3.491	-1.9	No	
008	2.3E+4	4.362	1.6	NO	
009	7.0E+2	2.845	-4.5	no	
010	1.41E+3	3.149	-3.3	yes	
011	6.8E+2	2.833	-4.6	No	
012	8.9E+3	3.949	-0.1	no	
016	7.1E+2	2.851	-4.5	NO	
024	1.5E+4	4.176	0.8	NO	
027	9700	3.987	0.1	no	
030	350	2.544	-5.7	?yes	
031	1.5E+4	4.176	0.8	yes	
040	1.1E+3	3.041	-3.7	yes	
042	7.3E3	3.863	-0.4	NO	
055	12000	4.079	0.4	no	
062	7.0E+3	3.845	-0.5	NO	
069	4.6E+3	3.663	-1.2	yes	
074	1.2E+4	4.079	0.4	NO	
078	9400	3.973	0.0	yes	
080	244	2.387	-6.3	no	
081	*	20	1.301	-10.7	No
082	6.0E+3	3.778	-0.8	no	

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

* tested outside of the time frame recommended for analysis

† information as supplied by participants

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

laboratory number	coliforms				
	assigned value 3.97 log ₁₀ cfu/g				
	result, cfu/g	result, log ₁₀ cfu/g	z-score	most probable number technique used †	
094	8.7E+3	3.940	-0.1	no	
105	*	1.58E+3	3.199	-3.1	14.03.2017
117		1.0E+4	4.000	0.1	no
118		1.5E+6	6.176	8.8	no
122	*	8.8E+3	3.944	-0.1	no
135		5.5E+3	3.740	-0.9	no
136		1.02E+4	4.009	0.1	yes
139	*	1.0E+4	4.000	0.1	no
145		9050	3.957	-0.1	yes
147	*	1.7E+3	3.230	-3.0	yes
151		7.5E+3	3.875	-0.4	NO
170		1.33E+4	4.124	0.6	no
171		1.1E+4	4.041	0.3	NO
175		6.2E+3	3.792	-0.7	yes
176		2.4E+3	3.380	-2.4	yes
178		1.1E+4	4.041	0.3	No
179		1.0E+4	4.000	0.1	no
182	*	1.145E+4	4.059	0.3	no
185		2180	3.338	-2.5	No
187		5.7E+2	2.756	-4.9	No
192		203	2.307	-6.7	No

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

* tested outside of the time frame recommended for analysis

† information as supplied by participants

Table 3: Results and Assessments for *C. sakazakii* in Infant Formula

laboratory number	<i>C. sakazakii</i>		assessment
	test material A	test material B	
	present	absent	
022	detected	not detected	S
036	not detected	not detected	NS
043	detected	not detected	S
044	detected	not detected	S
049	detected	not detected	S
057	detected	not detected	S
060	detected	not detected	S
061	detected	not detected	S
063	detected	detected	NS
076	detected	not detected	S
078	detected	not detected	S
087	detected	not detected	S
091	detected	not detected	S
094	detected	not detected	S
099	detected	not detected	S
100	detected	not detected	S
106	detected	not detected	S
108	detected	not detected	S
110	detected	not detected	S
118	detected	not detected	S
119	detected	not detected	S
123	detected	not detected	S
127	detected	not detected	S
129	detected	not detected	S
130	detected	not detected	S
133	not detected	not detected	NS
137	detected	not detected	S

S = satisfactory

NS = not satisfactory

Table 3 (continued): Results and Assessments for *C. sakazakii* in Infant Formula

laboratory number	<i>C. sakazakii</i>		assessment
	test material A	test material B	
	present	absent	
141	not detected	not detected	NS
142	detected	not detected	S
143	detected	not detected	S
146	detected	not detected	S
148	detected	not detected	S
149	detected	not detected	S
152	detected	not detected	S
159	detected	not detected	S
164	not detected	not detected	NS
169	not detected	not detected	NS
177	* not detected	detected	NS
178	detected	not detected	S
184	* not detected	not detected	NS
189	not detected	not detected	NS

S = satisfactory

NS = not satisfactory

* tested outside of the time frame recommended for analysis

Table 4: Results and Assessments for *L. monocytogenes* and *Listeria* spp. on Sponge Swab

laboratory number	<i>L. monocytogenes</i>			<i>Listeria</i> spp.		
	test material A	test material B	assessment	test material A	test material B	assessment
	absent	present		absent	present	
018	not detected	detected	S	not detected	detected	S
020	not detected	detected	S	not detected	detected	S
023	not detected	detected	S			
026	not detected	detected	S			
033	not detected	detected	S			
034	not detected	detected	S	not detected	detected	S
035	not detected	detected	S	not detected	not detected	NS
036	not detected	detected	S			
037	not detected	detected	S			
045	not detected	detected	S	not detected	detected	S
047	not detected	detected	S			
048	not detected	detected	S	not detected	detected	S
056	not detected	detected	S	not detected	detected	S
059	not detected	detected	S	not detected	detected	S

S = satisfactory

NS = not satisfactory

Table 4 (continued): Results and Assessments for *L. monocytogenes* and *Listeria* spp. on Sponge Swab

laboratory number	<i>L. monocytogenes</i>			<i>Listeria</i> spp.		
	test material A	test material B	assessment	test material A	test material B	assessment
	absent	present		absent	present	
065	not detected	detected	S			
070	not detected	detected	S			
077	not detected	detected	S	not detected	detected	S
078	not detected	detected	S	not detected	detected	S
079	not detected	detected	S	not detected	detected	S
085	not detected	detected	S			
089	not detected	detected	S	not detected	detected	S
090	not detected	detected	S	not detected	detected	S
091	not detected	detected	S			
095	not detected	detected	S	not detected	detected	S
096	not detected	detected	S	not detected	detected	S
101	not detected	detected	S			
102	not detected	detected	S	not detected	detected	S
103	not detected	detected	S	not detected	detected	S

S = satisfactory

Table 4 (continued): Results and Assessments for *L. monocytogenes* and *Listeria* spp. on Sponge Swab

laboratory number	<i>L. monocytogenes</i>			<i>Listeria</i> spp.			
	test material A	test material B	assessment	test material A	test material B	assessment	
	absent	present		absent	present		
106	not detected	detected	S				
109	not detected	detected	S	not detected	detected	S	
111	not detected	detected	S	not detected	detected	S	
112	not detected	detected	S	not detected	not detected	NS	
113	not detected	detected	S				
114	not detected	detected	S	not detected	detected	S	
115	not detected	detected	S	not detected	detected	S	
116		not detected			detected		
119	not detected	detected	S	not detected	detected	S	
121	not detected	detected	S	not detected	detected	S	
122	*	not detected	detected	S	not detected	detected	S
125	not detected	detected	S	not detected	detected	S	
128	not detected	detected	S	not detected	detected	S	
131	not detected	detected	S	not detected	detected	S	

S = satisfactory

NS = not satisfactory

* tested outside of the time frame recommended for analysis

Table 4 (continued): Results and Assessments for *L. monocytogenes* and *Listeria* spp. on Sponge Swab

laboratory number	<i>L. monocytogenes</i>			<i>Listeria</i> spp.			
	test material A	test material B	assessment	test material A	test material B	assessment	
	absent	present		absent	present		
132	not detected	detected	S	not detected	not detected	NS	
140	not detected	detected	S	not detected	detected	S	
151	not detected	detected	S	not detected	detected	S	
152	not detected	detected	S	not detected	detected	S	
153	not detected	detected	S	not detected	detected	S	
155	not detected	detected	S	not detected	detected	S	
157	not detected	detected	S	not detected	detected	S	
158	not detected	detected	S	not detected	detected	S	
160	not detected	detected	S	not detected	detected	S	
161	not detected	detected	S				
163	*	not detected	detected	S	not detected	detected	S
165	not detected	detected	S	not detected			
167	not detected	detected	S	not detected	detected	S	
168	not detected	detected	S	not detected	detected	S	
173				not detected	detected	S	

S = satisfactory

NS = not satisfactory

* tested outside of the time frame recommended for analysis

Table 4 (continued): Results and Assessments for *L. monocytogenes* and *Listeria* spp. on Sponge Swab

laboratory number	<i>L. monocytogenes</i>			<i>Listeria</i> spp.		
	test material A	test material B	assessment	test material A	test material B	assessment
	absent	present		absent	present	
180	not detected	detected	S	not detected	not detected	NS
183	not detected	detected	S	not detected	detected	S
191	not detected	detected	S			
193	not detected	not detected	NS	not detected	not detected	NS
194	not detected	detected	S			
198	* not detected	detected	S	not detected	detected	S

S = satisfactory

NS = not satisfactory

* tested outside of the time frame recommended for analysis

Table 5: Results and Assessments for *Salmonella* spp. in Chicken

laboratory number	<i>Salmonella</i> spp.		assessment	
	test material A	test material B		
	absent	present		
006	not detected	detected	S	
008	not detected	detected	S	
013	not detected	detected	S	
029	not detected	detected	S	
032	not detected	detected	S	
036	not detected	detected	S	
041	not detected	detected	S	
045	not detected	detected	S	
050	*	not detected	detected	S
053		not detected	detected	S
055		not detected	detected	S
059		not detected	detected	S
062		not detected	detected	S
064		not detected	detected	S
071		not detected	detected	S
072		not detected	detected	S
073		not detected	detected	S
074		not detected	detected	S
075		not detected	detected	S
078		not detected	detected	S
082		not detected	detected	S
084	‡	not detected	detected	S
089		not detected	detected	S
091		not detected	detected	S
093		not detected	detected	S
096		not detected	detected	S
103		not detected	detected	S

S = satisfactory

* tested outside of the time frame recommended for analysis

‡ PCR used

Table 5 (continued): Results and Assessments for *Salmonella* spp. in Chicken

laboratory number	<i>Salmonella</i> spp.		assessment
	test material A	test material B	
	absent	present	
107	not detected	detected	S
120	* not detected	detected	S
124	* not detected	detected	S
126	not detected	detected	S
130	not detected	detected	S
134	* not detected	detected	S
138	* not detected	detected	S
140	not detected	detected	S
144	not detected	detected	S
148	not detected	detected	S
153	not detected	detected	S
154	not detected	detected	S
160	not detected	detected	S
162	* not detected	detected	S
166	* not detected	detected	S
174	not detected	detected	S
182	* not detected	detected	S
186	not detected	detected	S
188	not detected	detected	S
192	not detected	detected	S
196	not detected		
197	not detected	detected	S

S = satisfactory

* tested outside of the time frame recommended for analysis

Table 6: Results and Assessments for *Salmonella* spp. on Sponge Swab

laboratory number	<i>Salmonella</i> spp.		assessment
	test material A	test material B	
	present	absent	
007	detected	not detected	S
018	detected	not detected	S
019	detected	not detected	S
020	detected	detected	NS
025	detected	not detected	S
033	detected	not detected	S
034	detected	not detected	S
035	detected	not detected	S
036	detected	not detected	S
037	detected	not detected	S
038	detected	not detected	S
039	detected	not detected	S
045	detected	not detected	S
047	detected	not detected	S
048	detected	not detected	S
058	detected	not detected	S
059	detected	not detected	S
065	detected	not detected	S
066	detected	not detected	S
067	detected	not detected	S
068	detected	not detected	S
071	detected	not detected	S
078	detected	not detected	S
085	detected	not detected	S
086	detected	not detected	S
088	detected	not detected	S

S = satisfactory

NS = not satisfactory

Table 6 (continued): Results and Assessments for *Salmonella* spp. on Sponge Swab.

laboratory number	<i>Salmonella</i> spp.		assessment	
	test material A	test material B		
	present	absent		
089	detected	not detected	S	
095	detected	not detected	S	
097	detected	not detected	S	
098	detected	not detected	S	
101	detected	not detected	S	
102	detected	not detected	S	
103	detected	not detected	S	
104	detected	not detected	S	
106	detected	not detected	S	
119	detected	not detected	S	
121	detected	not detected	S	
123	detected	not detected	S	
124	*	detected	not detected	S
128	detected	not detected	S	
131	detected	not detected	S	
132	detected	not detected	S	
140	detected	not detected	S	
150	#	detected	not detected	S
151	detected	not detected	S	
152	detected	not detected	S	
155	detected	not detected	S	
156	*	detected	not detected	S
157	not detected	detected	NS	
158	not detected	not detected	NS	
160	detected	not detected	S	

S = satisfactory

NS = not satisfactory

* tested outside of the time frame recommended for analysis

sample received outside of the recommended timeframe for analysis

Table 6 (continued): Results and Assessments for *Salmonella* spp. on Sponge Swab

laboratory number		<i>Salmonella</i> spp.		assessment
		test material A	test material B	
		present	absent	
162	*	detected	not detected	S
163	*	detected	not detected	S
173		detected	detected	NS
182	*	detected	not detected	S
190		detected	not detected	S
191		detected	not detected	S
193		detected	not detected	S
194		detected	detected	NS

S = satisfactory

NS = not satisfactory

* tested outside of the time frame recommended for analysis

Table 7: Assigned Values and Standard Deviations for Enumeration Tests

proficiency test	data points, n	assigned value, x_a , $\log_{10}\text{cfu/g}$	uncertainty, u	standard deviation for proficiency, σ_p , $\log_{10}\text{cfu/g}$
enumeration of <i>B. cereus</i> in beef	29	4.83	0.027	0.25
aerobic plate count in beef	28	4.91	0.024	0.25
enumeration of coliforms in milk powder	45	3.97	0.034	0.25

Table 8: 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 <i>B. cereus</i> in beef	28	29	97
aerobic plate count in beef	26	29	90
enumeration of coliforms in milk powder	29	45	64

Table 9: Intended Results for Proficiency Tests in Detection

proficiency test	test material A	test material B
detection of <i>Cronobacter sakazakii</i> in infant formula	detected	not detected
detection of <i>L. monocytogenes</i> on sponge swab	not detected	detected
detection of <i>Listeria</i> spp. on sponge swab	not detected	detected
detection of <i>Salmonella</i> spp. in chicken	not detected	detected
detection of <i>Salmonella</i> spp. on sponge swab	detected	not detected

Table 10: 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 <i>Cronobacter sakazakii</i> in infant formula	32	41	78	20	5
detection of <i>L. monocytogenes</i> on sponge swab	60	61	98	3	0
detection of <i>Listeria</i> spp. on sponge swab	40	45	89	11	0
detection of <i>Salmonella</i> spp. in chicken	48	48	100	0	0
detection of <i>Salmonella</i> spp. on sponge swab	54	59	92	3	7

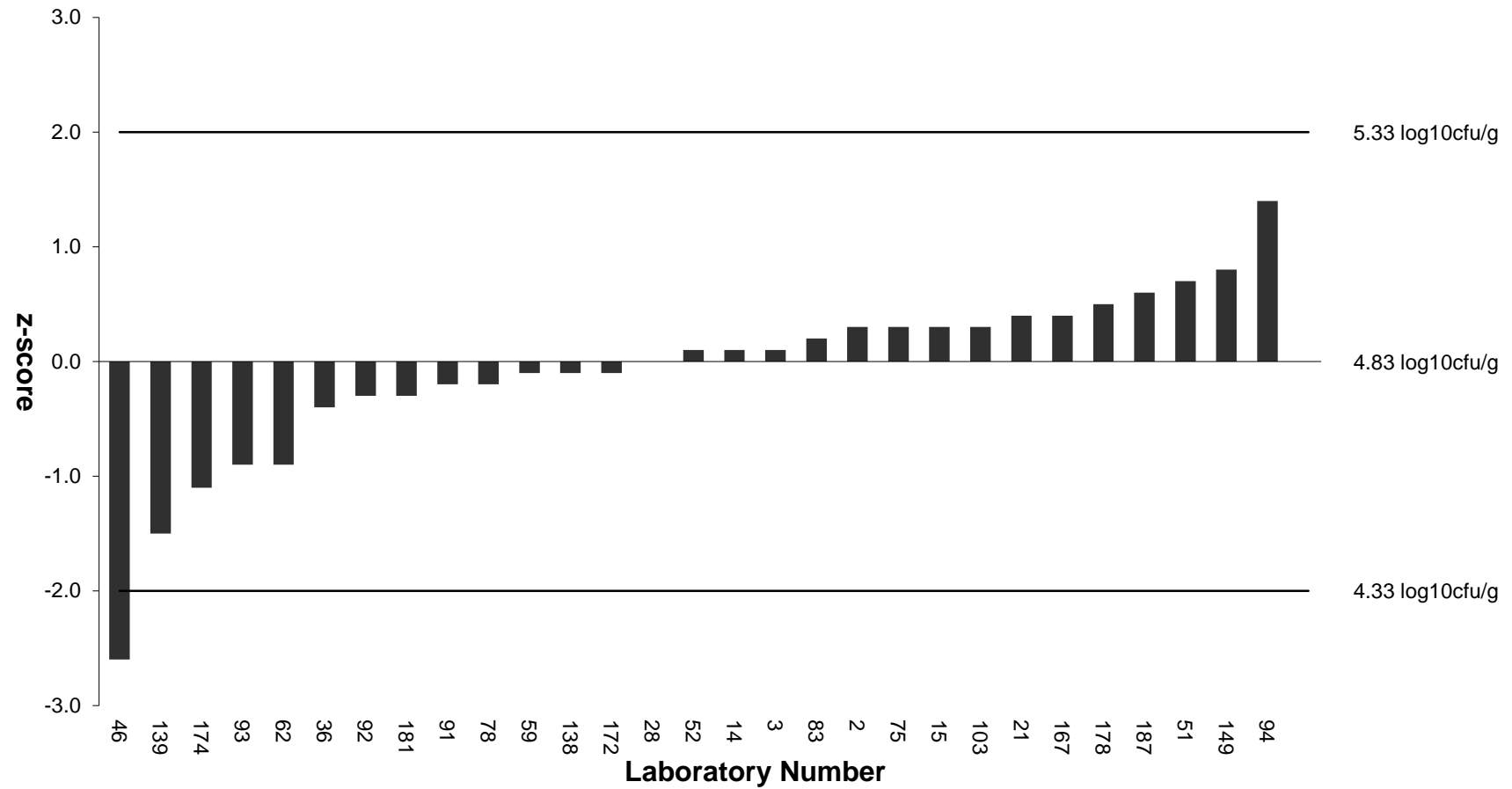


Figure 1: z-Scores for *B. cereus* in Beef

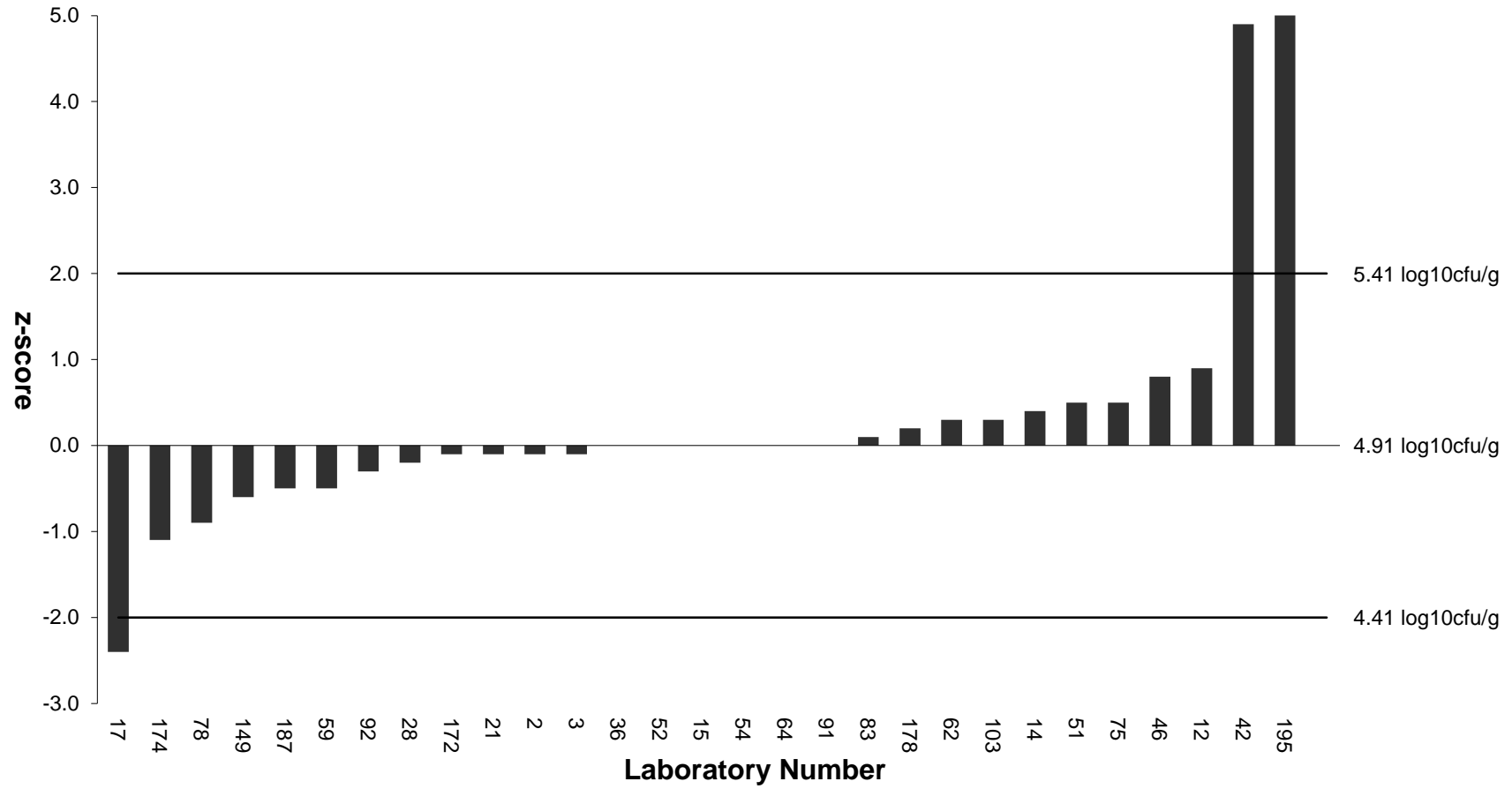


Figure 2: z-Scores for Aerobic Plate Count in Beef

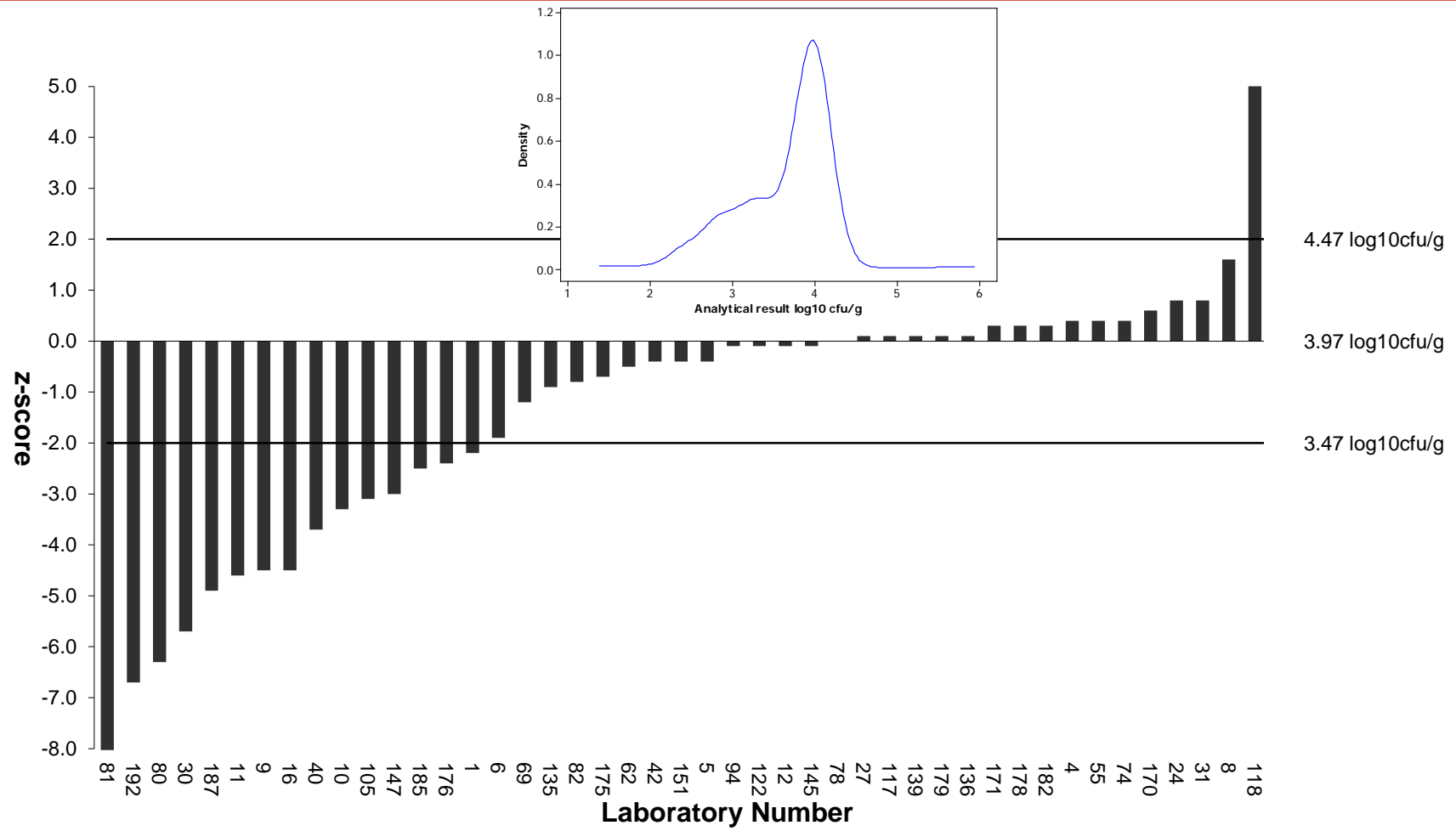


Figure 3: z-Scores for Coliforms in Milk Powder

Insert presents the kernel density plot

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

proficiency test	matrix	target organism	background flora
enumeration of <i>B. cereus</i>	beef	<i>Bacillus cereus</i>	<i>Lactobacillus plantarum</i> <i>Kocuria rhizophila</i> <i>Pseudomonas aeruginosa</i>
aerobic plate count	beef	<i>B. cereus</i> <i>L. plantarum</i> <i>K. rhizophila</i> <i>P. aeruginosa</i>	n/a
enumeration of coliforms	milk powder	<i>Escherichia coli</i>	<i>Pseudomonas fluorescens</i> <i>Enterococcus faecalis</i>
detection of <i>C. sakazakii</i> test material A	infant formula	<i>Cronobacter sakazakii</i>	<i>E. coli</i>
detection of <i>C. sakazakii</i> test material B	infant formula	none	<i>E. coli</i>
detection of <i>L. monocytogenes</i> / <i>Listeria spp.</i> test material A	sponge swab	none	<i>E. coli</i> <i>Bacillus subtilis</i> <i>Citrobacter freundii</i>
detection of <i>L. monocytogenes</i> / <i>Listeria spp.</i> test material B	sponge swab	<i>Listeria monocytogenes</i>	<i>E. coli</i> <i>B. subtilis</i> <i>C. freundii</i>
detection of <i>Salmonella</i> spp. test material A	chicken	none	<i>C. freundii</i> <i>Proteus mirabilis</i> <i>B. cereus</i>
detection of <i>Salmonella</i> spp. test material B	chicken	<i>Salmonella</i> Cerro	<i>E. coli</i> <i>P. mirabilis</i> <i>B. cereus</i>
detection of <i>Salmonella</i> spp. test material A	sponge swab	<i>Salmonella</i> Cerro	<i>E. coli</i> <i>B. subtilis</i> <i>K. rhizophila</i>
detection of <i>Salmonella</i> spp. test material B	sponge swab	none	<i>E. coli</i> <i>B. subtilis</i> <i>K. rhizophila</i>

n/a not applicable

APPENDIX II: Verification of Positive Qualitative Test Materials

target organism	level of target organism, as assessed by the most probable number technique, MPN/g
<i>Cronobacter sakazakii</i> in infant formula	920.0 (280 to 3000*) / 1600 (530 to 4900*)
<i>Listeria monocytogenes</i> on sponge swab	540.0 (160 to 1900*) / 540.0 (160 to 1900*)
<i>Salmonella</i> Cerro in chicken	17.0 (6.3 to 45*) / 17.0 (6.3 to 45*)
<i>Salmonella</i> Cerro on sponge swab	>1600 / >1600

*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.

Enumeration of *B. cereus* and Aerobic Plate Count

Accredited Method Used	laboratory number
yes	012 015 017 021 028 046 051 059 062 083 092 103 149 167 174 178 187 195

Method Based on an International Standard	laboratory number
yes	012 015 017 021 046 051 059 062 083 092 103 149 174 178 187 195
no	028 167

Which International Standard	laboratory number
APC (pour plate) ISO 4833-1:2013	012 015 017 021 046
APC (spread plate) ISO 4833-1:2013	149 195
APC ISO 4833:2003	103
APC FDA/BAM Chapter 3	092
APC AOAC 990.12	083
Bacillus Cereus enumeration FDA/BAM Chapter 14	187
Bacillus Cereus enumeration ISO 7932:2004	051 059 149
Salmonella spp. detection ISO 6579:2002/Amd 1:2007	149
CCFRA-3.7.1:2007	174

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	012 015 017 046 051 062 083 174 195
Butterfield's Phosphate Buffer	178 187
Maximum Recovery Diluent (MRD)	103
Peptone Water	021 028 059 092 149 167

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	017 062 083 092 149
Listeria Enrichment Broth 1 (LEB)	167

Which Secondary Enrichment Medium Used	laboratory number
Rappaport Vassiliadis Broth (RV)	092
Tetrathionate Broth	149

Plating Method Used	laboratory number
Pour plate	012 015 017 021 046 062 092 103
Spread plate	028 051 059 083 149 167 174 178 187 195

Inoculum Volume (ml)	laboratory number
0.1	028 051 059 083 149 174 178 187 195
1.0	015 017 021 046 092 103

Alternative/Rapid Method	laboratory number
Petrifilm (3M)	083

Incubation Temperature (°C)	laboratory number
25	092
30	012 015 017 021 028 046 051 059 062 103 178 187 195
35	083 167
37	149 174

Time Incubated (hours) Approximately	laboratory number
18	178
24	015 059 083 174 187
48	028 051 149 167
60	017 021 046 092 103 195

Confirmation of Organism's Identity	laboratory number
API 50 CH	083 149 167 174
Fermentation of Carbohydrates	051
Haemolysis	059
Latex slide agglutination	092
Morphology	015 028
Microscopy	028
Nitrate/nitrite reduction	051
VITEK	028 178

Selective/Chromogenic Medium Used for <i>B. cereus</i>	laboratory number
Bacillus Cereus Agar (BCA)	167 174
Mannitol Egg Yolk Polymixin B Agar (MYP)	021 046 051 059 062 083 092 103 178 187
PEMBA	149
Bacara agar	178
Bacillus cereus Chromagenic Medium (BACARA)	015

Selective/Chromogenic Medium Used for APC	laboratory number
Petrifilm (3M) Aerobic Plate Count	062 083
Plate Count Agar (PCA)	012 015 017 021 046 051 059 092 103 149 174 178 187 195

Enumeration of Coliforms

Accredited Method Used	laboratory number
yes	004 008 010 011 012 016 024 031 040 069 082 118 122 135 136 147 171 178 179 187 192
no	001 005 009 055 062 105 117 145 151 182

Method Based on an International Standard	laboratory number
yes	004 005 008 009 010 011 012 016 024 031 040 055 062 082 105 118 122 135 136 145 147 151 171 178 179 182 187 192
no	001 117

Which International Standard	laboratory number
APC AOAC 990.12	171
Coliforms enumeration ISO 4832:2006	004 008 009 011 012 016 024 055 122 151 182 187
Coliforms enumeration AOAC 991.14	005 010 082 135
Coliforms enumeration (MPN) ISO 4831:2006	040
Enumeration of coliform bacteria in food products using 3M petrifilm coliform count plates	062
IS-5401 (Part -II); 2012	192
Most Probable Number and chromocult	136
TFDA 1021950329	031

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	004 009 011 012 016 040 055 062 105 145
Butterfield's Phosphate Buffer	010 136 178 192
Maximum Recovery Diluent (MRD)	008 024 182
Peptone Water	005 031 082 187
Phosphate Buffered Saline (PBS)	069 118 179
Ringer's Solution	122 147 171
Tryptone Water	151

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	012 016 055 062 105 145 192
Fraser Broth	024
Modified Lauryl Sulphate Tryptose Broth (mLST)	069 136
Lauryl Sulphate Broth	004 040

Which Secondary Enrichment Medium Used	laboratory number
Brilliant Green Bile Broth (BGBB)	004 008
Brilliant Green Bile Lactose Broth (BGLB)	012 024 031 069 136 187
Rappaport Vassiliadis Soya Peptone(RVS)	040

Plating Method Used	laboratory number
Pour plate	001 004 008 009 011 012 016 031 055 062 105 117 122 145 147 187 192
Spread plate	024 118 171 178 179 182
Overlay	151

Inoculum Volume (ml)	laboratory number
0.01	069
0.1	004 024 118 147
1.0	001 005 008 009 010 011 016 031 040 055 062 082 105 117 122 135 136 145 151 171 178 179 187 192

Alternative/Rapid Method	laboratory number
Most Probable Number - Tube	069 136
Most probable Number - Automated	024
Petrifilm (3M)	005 008 010 031 062 082 135 171

Incubation Temperature (°C)	laboratory number
30	012 151
35	001 005 008 010 031 069 082 118 135 136 145 171 178 179 192
37	004 009 011 016 024 040 055 062 105 117 122 147 182 187

Time Incubated (hours) Approximately	laboratory number
18	117 178
24	001 004 005 008 009 010 011 012 016 024 055 062 082 105 122 135 145 147 151 171 182 187
48	040 069 118 136 179 192
60	031

Confirmation of Organism's Identity	laboratory number
API 20E	118 182
API RapidID 20E	122
Coagulase reaction - tube test	179
Fermentation of Carbohydrates	192
Morphology	031 122 192
Microscopy	122
Oxidase reaction	004 122 147
VITEK	024 171 178

Selective/Chromogenic Medium Used	laboratory number
Brilliant Green Bile Lactose Broth (BGLB)	031 040 055 069 187
Chromocult Coliform Agar	008 118 136 147 178 179
Endo Agar	004 122
Petrifilm (3M) Colliforms	010 062 082 135 171
Violet Red Bile Agar (VRB)	011 024 105 145 151
Violet Red Bile Lactose Agar (VRBL)	009 012 016 122 187 192
Deoxycholate Lactose Agar	001
XM-G Agar	117

Detection of *Cronobacter sakazakii*

Accredited Method Used	laboratory number
yes	043 057 060 061 063 076 087 106 110 118 119 129 130 133 137 141 142 146 148 149 159 169 178 184
no	022 049 108 143 164

Method Based on an International Standard	laboratory number
yes	022 043 049 057 060 063 076 087 106 108 110 118 119 129 130 133 137 141 142 143 146 148 149 164 169 178 184
no	061 159

Which International Standard	laboratory number
APC ISO 4833:2003	119
<i>Cronobacter sakazakii</i> detection ISO/TS 22964:2006 (IDF/RM 210:2006)	043 060 063 076 087 106 108 129 130 133 137 141 142 143 146 149 159 164 169 184
based on DIN EN ISO 22964 2015	049

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	022 043 057 060 061 063 076 087 106 108 118 119 129 130 137 141 142 143 146 149 164 184

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	022 049 133 149 159 178
Enterobacteriaceae Enrichment broth (EE)	118 148
Modified Lauryl Sulphate Tryptose Broth (mLST)	043 057 061 063 076 087 106 119 129 130 137 141 142 146 164 184
Lauryl Sulphate Broth	060

Plating Method Used	laboratory number
Spread plate	043 057 060 061 076 087 106 108 130 143 159 164
Overlay	063

Inoculum Volume (ml)	laboratory number
0.001	061
0.01	130 143
0.1	043 060 087 106 108 159
1.0	057 063
>2.0	148

Alternative/Rapid Method	laboratory number
Compact dry	063
PCR	022 061 129 164

Incubation Temperature (°C)	laboratory number
35	118 148 178
37	022 049 061 119 129
44	043 057 060 063 076 087 106 108 130 137 141 142 143 149 159 164

Time Incubated (hours) Approximately	laboratory number
18	049 119 164 178
24	022 043 057 060 061 063 076 087 106 108 118 129 130 137 141 142 143 148 149 159

Confirmation of Organism's Identity	laboratory number
API 20E	061 063 076 087 106 118 119 130 146 149 159 184
API RapidID 20E	149
Enterotube (BBL)	043
Morphology	129
Microscopy	061
Ornithine decarboxylase	143
PCR	022 049 164
VITEK	061 108 142 178

Which Selective/Chromogenic Medium Used	laboratory number
Brilliance Enterobacter Sakazakii Agar	149 178
CHROMagar E.sakazakii Agar	043 061
Enterobacter sakazakii Isolation Agar (ESIA)	057 060 063 076 087 106 108 118 119 129 130 137 142 143 146 159
Tryptic Soya Agar	061 108 130
Violet Red Bile Dextrose Agar (VRBD)	148
R& F agar	178

Detection of *L. monocytogenes* / *Listeria* spp.

Accredited Method Used	laboratory number
yes	023 047 056 059 070 085 089 103 109 111 112 114 121 122 125 131 132 140 153 157 161 163 165 167 173 183 194
no	018 033 048 065 077 095 101 106 113 119 151 168 180 191 193

Method Based on an International Standard	laboratory number
yes	018 033 047 056 059 065 095 103 106 109 111 112 114 119 121 122 125 131 132 140 151 153 157 161 163 168 173 183 191 193 198
no	023 048 070 077 085 089 101 113 165 167 180 194

Which International Standard	laboratory number
APC FDA/BAM Chapter 3	173
Listeria monocytogenes detection ISO 11290-1:1996	018 103 106 121 194
Listeria monocytogenes detection ISO 11290-1:1996/Amd 1:2004	047 059 065 095 109 112 114 121 122 125 140 151 153 157 168 183
Listeria monocytogenes enumeration ISO 11290-2:1998/Amd 1:2004	056 131
BAM	132
AFNOR Certification Attestation No. BRD- 07/04-09/98	023
Compass Listeria	113
Compendium 2015	193
Congen Sure Fast ® Listeria monocytogenes PLUS, Version 2.2, 2017-01	033
Ensayo VIDAS LMX	085
FDA-BAM	119
Listeria monocytogenes FDA/BAM Chaper 10	161
MFLP15	111
MLG 8A	191
Palcam broth-Aloa	077
System Real-Time PCR Assay	070

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	023 033 065 077 101 106 109 111 113 119 121 122 140 161 167 168 180 198
Half Fraser Broth	018 047 048 056 070 089 125 131 153 157 183 194
Peptone Water	095
Phosphate Buffered Saline (PBS)	132

Which Primary Enrichment Medium Used	laboratory number
Fraser Broth	033 131 168 183
Half Fraser Broth	018 023 047 056 059 065 070 089 095 103 106 109 112 113 114 121 122 125 140 151 153 157 194
Listeria Enrichment Broth 1 (LEB)	101 119 132 167 180 193
Listeria Enrichment Broth 2 (LEB)	085 161

Which Secondary Enrichment Medium Used	laboratory number
Bolton Broth	101 173
Fraser Broth	047 056 059 095 103 109 112 114 121 122 125 132 140 151 153 157 168 183 194
Rappaport Vassiliadis Soya Peptone(RVS)	131

Plating Method Used	laboratory number
Pour plate	089
Spread plate	018 023 047 048 056 095 101 103 106 109 111 122 125 131 132 140 151 153 161 167 183 194
Overlay	059 065 077 121

Inoculum Volume (ml)	laboratory number
0.001	077 089 109
0.01	059 101 103 111 113 125 153
0.05	056
0.1	018 023 047 048 065 095 106 122 131 132 140 151 161 168 183 194
1.0	121
>2.0	198

Alternative/Rapid Method	laboratory number
MOLDI-TOF	056
PCR	033 070 111 114 140 157 161 167 183 191
Petrifilm (3M)	198
RapidChek	089
Reveal	173
VIDAS (ELFA)	059 085 163
miniVIDAS (ELFA)	132

Incubation Temperature (°C)	laboratory number
30	033 059 065 070 077 101 114 119 168 173 180 183
35	111 132 161 165 167 193
37	018 023 047 048 056 085 089 095 103 106 109 112 113 121 122 125 131 140 151 153 157 194 198

Time Incubated (hours) Approximately	laboratory number
18	194
24	023 033 059 065 070 085 101 121 131 132 140 151 157 168 173 183 198
48	018 047 048 056 077 089 095 103 106 109 111 112 113 119 122 125 153 161 165 167 180 193

Confirmation of Organism's Identity	laboratory number
API Listeria	047 059 065 095 106 109 114 119 122 140 153 163 180 183 193
CAMP test	059 101 157 168
Catalase reaction	059 122 151 168
Fermentation of Carbohydrates	018 048 059 089 131 165
Haemolysis	023 059 125 151 153 165 168
Morphology	059 122
Microscopy	122
Motility	059 122 165 168
Microbact 12E	194
Oxidase reaction	056 122
PCR	033
VITEK	111 121 132 161 167 180
Microbact 12L	085 112

Detection of *Salmonella* spp. in Chicken

Accredited Method Used	laboratory number
yes	008 029 041 053 059 062 082 084 089 103 130 134 140 144 148 153 154 166 174 186 188 192 196 197
no	055 073 162 182

Method Based on an International Standard	laboratory number
yes	008 029 041 053 055 059 062 073 082 084 103 130 134 140 144 148 153 154 166 174 182 186 188 192 196 197
no	089 162

Which International Standard	laboratory number
Listeria monocytogenes enumeration ISO 11290-2:1998	197
Salmonella spp. detection ISO 6579:2002	041 062 073 082 103 134 182 196
Salmonella spp. detection ISO 6579:2002/Amd 1:2007	053 084 130 140 153 154 188
Salmonella spp. detection FDA/BAM Chapter 5	008 029 166 186

Which International Standard (continued)	laboratory number
AFNOR BKR 23/07-10/11	055
IS-5887-part-III: 1999 (Reaffirmed 2005)	192
Rapid Detection of Salmonella spp. By PCR Amplification of Salmonella Specific Region in gatD gene. Jpn. J. Food Microbiol., 16(2), 99 – 109.	082
Vidas SLM (AFNOR No.BOI-12/16-09/05)	059

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	008 029 041 053 055 059 062 073 082 084 130 134 140 144 153 162 166 174 182 186 188 192 196 197
Phosphate Buffered Saline (PBS)	089

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	008 041 059 062 073 103 140 148 153 154 162 174 182 186 192 197
Mueller Kauffman Tetrathionate Novobiocin Broth (MKKTn)	053 082 130 134 196
Rappaport Vassiliadis Broth (RV)	144 166
Modified Semi-Solid Rappaport Vassiliadis (MSRV)	084
Rappaport Vassiliadis Soya Peptone(RVS)	082 130 188 196

Which Secondary Enrichment Medium Used	laboratory number
Rappaport Vassiliadis Broth (RV)	029 073 140 148 186 192
Rappaport Vassiliadis Soya Peptone(RVS)	008 041 053 062 103 134 153 154 162 174 182
Tetrathionate Broth	029 103 140 144 153 166 174 182 186

Plating Method Used	laboratory number
Pour plate	053 055 089
Spread plate	008 041 062 073 103 130 134 140 153 154 166 182 192 196 197
Overlay	059 162

Inoculum Volume (ml)	laboratory number
0.001	089
0.01	041 055 059 062 103 130 153
0.05	008
0.1	073 134 140 154 162 166 188 192
1.0	148 197

Alternative/Rapid Method	laboratory number
PCR	082 084 130 140 182 188
RapidChek	089
VIDAS (ELFA)	008 059 196
miniVIDAS (ELFA)	041 053

Incubation Temperature (°C)	laboratory number
35	008 144 148 166
37	029 053 059 062 073 082 089 103 130 134 140 153 154 162 174 182 186 192 197
41.5	041 084
42	188

Time Incubated (hours) Approximately	laboratory number
18	029 089 140 188
24	008 041 053 055 059 062 073 082 084 103 130 134 144 148 153 154 162 166 174 182 186 192 197

Confirmation of Organism's Identity	laboratory number
API 20E	053 059 062 130 140 153 154 162 174 182 186 196
API RapidID 20E	008
API Listeria	197
beta-Galactosidase	053 082 144
Fermentation of Carbohydrates	144
IMViC test	144
Indole production	053 059 082 144
Latex slide agglutination	089 140
Lysine Decarboxylase	053 059 082 144
Lysine Iron Agar	059 144
Morphology	082 134 182 192
Microscopy	144 192
Oxidase reaction	053 130
Serological agglutination test	053 059 084 130 134 144 153 182
PCR	130 140 188
VITEK	029 041 053 166
Voges-Proskauer (VP) reaction	053 059 082 144 192
Triple Sugar Iron Agar (TSI)	053 059 082 134 144 192

Detection of *Salmonella* spp. on Sponge swab

Accredited Method Used	laboratory number
yes	007 019 025 038 047 058 059 065 086 088 089 097 103 104 106 121 131 132 140 157 162 163 190 194
no	018 033 048 066 067 068 085 095 101 119 151 182 191 193

Method Based on an International Standard	laboratory number
yes	007 018 019 025 033 047 048 059 065 086 095 097 103 104 106 119 121 131 132 140 151 157 163 182 190 191 193
no	038 058 066 067 068 085 088 089 101 162 194

Which International Standard	laboratory number
Salmonella spp. detection ISO 6579:2002	048 098 103 119 121 131 151 182 194
Salmonella spp. detection ISO 6579:2002/Amd 1:2007	018 019 025 047 065 086 095 140 157 190
Salmonella spp. detection ISO 6579:2002/Cor 1:2004 (en)	059 106
AOAC Official Method 2013.09	007
BAM	132
Compendium 2015	193
Congen Sure Fast® Salmonella ONE, Version 1.2, 2016-12	033
MLG 4C	191

Which Initial Suspension/Diluent Used	laboratory number
Buffered Peptone Water (BPW)	007 018 019 025 033 047 048 059 065 066 067 068 085 086 088 095 097 098 101 104 106 119 121 131 140 151 157 162 182 194
Phosphate Buffered Saline (PBS)	089 132

Which Primary Enrichment Medium Used	laboratory number
Buffered Peptone Water (BPW)	007 018 038 048 058 059 086 088 095 097 101 103 121 132 140 157 162 182 190 194
Mueller Kauffman Tetrathionate Novobiocin Broth (MKKTn)	065 106 131 151
Rappaport Vassiliadis Broth (RV)	025 098
Modified Semi-Solid Rappaport Vassiliadis (MSRV)	047
Rappaport Vassiliadis Soya Peptone(RVS)	047 106 119 151
Tryptone Soya Broth	193

Which Secondary Enrichment Medium Used	laboratory number
Rappaport Vassiliadis Broth (RV)	018 101 132 140
Rappaport Vassiliadis Soya Peptone(RVS)	048 058 059 065 095 103 121 131 157 162 190 193
Tetrathionate Broth	025 048 058 059 095 098 101 103 140 157 182

Plating Method Used	laboratory number
Pour plate	025 089
Spread plate	018 047 095 098 101 103 106 131 140 151 182 194
Overlay	048 059 065 121 162

Inoculum Volume (ml)	laboratory number
0.001	089
0.01	059 065 066 067 068 101 103
0.1	018 047 048 095 098 106 131 140 151
1.0	025 121 162 190 194

Alternative/Rapid Method	laboratory number
PCR	007 019 025 033 104 106 140 157 182 191 194
RapidChek	089
VIDAS (ELFA)	085 163
miniVIDAS (ELFA)	058 059 088 097 132

Incubation Temperature (°C)	laboratory number
35	098 193
37	007 018 019 025 038 047 048 059 065 066 067 068 085 086 089 095 101 103 104 106 119 121 131 132 140 151 157 162 182 190 194
41.5	033 088 097
42	058

Time Incubated (hours) Approximately	laboratory number
18	089 104 119 140 157 190 194
24	007 018 019 025 033 038 047 048 058 059 065 066 067 068 085 086 088 095 097 098 101 103 106 121 131 132 151 162 182 193

Confirmation of Organism's Identity	laboratory number
API 10S	194
API 20E	038 047 048 085 088 095 097 098 106 119 140 162 163 193
API RapidID 20E	058
CAMP test	157
Coagulase reaction - slide test	007
Enterotube (BBL)	018
Fermentation of Carbohydrates	131
IMViC test	151
Indole production	038 059
Latex slide agglutination	089 140
Lysine Decarboxylase	059
Lysine Iron Agar	059 101
Morphology	059
Serological agglutination test	048 059 086 101 157 182
PCR	033 140 157 190
VITEK	101 121 132
Voges-Proskauer (VP) reaction	059
Triple Sugar Iron Agar (TSI)	038 059 151

Which Selective/Chromogenic Medium Used	laboratory number
Bismuth Sulfite Agar (BSA)	058 151
Brilliant Green Agar (BGA)	038 058 059 119
Brilliance Salmonella Agar	086 194
Chromogenic Salmonella Agar (Oxoid)	095 140
ChromID Salmonella	163
Hektoen Agar	047
MacConkey Agar	058 098
Rambach Agar	103 132
Salmonella Chromogenic Medium	089 106
Xylose Lysine Desoxycholate Agar (XLD)	018 047 048 059 085 088 095 103 104 106 119 140 190 194
XLT-4 Agar	151
aloa	163
ASAP	018 048
Chrom ID salmo	059
Cromogénico Salmonella Plus Chromagar	065
DHL Agar	038
IBISA Agar	086
PCR	007 033
Rapid' Salmonella (Bio-rad)	066 067 068

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 [3, 4] 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 Rosemary A Smith (Round Coordinator). Participants with any comments or concerns about this proficiency test should contact:

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