REPORT NO. 1025

Pathogens In Food

Proficiency Testing Program

Round 35

May 2017

ACKNOWLEDGMENTS

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

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APPENDICES

1. FOREWORD

This report summarises the results of round thirty-five of a series of proficiency testing programs involving the analysis of different food types for the detection of a range of pathogens.

Proficiency Testing Australia conducted the program in April 2017. The aim of the program was to assess laboratories' abilities to competently perform the nominated tests.

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

2. FEATURES OF THE PROGRAM

(a) A total of seven laboratories received samples, all of which returned results for inclusion in the final report.

(b) The results reported by participants are presented in Appendix A.

(c) Laboratories were provided with five samples. Each sample consisted of a freeze-dried vial with an accompanying matrix. Each matrix consisted of a total of 60 g of whole milk powder. Laboratories were also provided with "Instructions to Participants" and "Results Sheets" (see Appendix D).

(d) Laboratories were requested to perform the tests according to their routine methods.

(e) Each laboratory was randomly allocated a unique code number for the program to ensure confidentiality of results. Reference to each laboratory in this report is by its code number.

3. FORMAT OF THE APPENDICES

APPENDIX A
Appendix A contains the results reported by participating laboratories for each of the five samples.

APPENDIX B
Appendix B contains a summary of the methods used by each laboratory.

APPENDIX C
Appendix C contains the results of the homogeneity and stability testing.

APPENDIX D
Appendix D contains the "Instructions to Participants" and pro-forma "Results Sheets".

4. DESIGN OF THE PROGRAM

Participants were asked to determine the presence or absence of *Salmonella*, *Listeria* and *Listeria monocytogenes* (*L. monocytogenes*) in five samples of whole milk powder.

Each laboratory was provided with five samples labelled A, B, C, D and E and was requested to test 25 g of each sample for each analysis.

- Sample A contained *Listeria monocytogenes*.
- Sample B contained *Salmonella* Salford.
- Sample C contained *Listeria monocytogenes*.
- Sample D contained *Salmonella* Senftenberg (H_2S negative strain) and *Listeria innocua*.
- Sample E contained *Salmonella* Adelaide and *Listeria innocua*.

Other "typical" microflora were included in the samples (*e.g. Escherichia coli*, *Enterococcus faecalis*, etc.) The levels of *Salmonella* and *Listeria* in each sample were between 100 – 500 cfu per 25 g.

Microbiological samples for the Pathogens in Food program are manufactured according to Global Proficiency Ltd's Standard Operating Procedures.

5. HOMOGENEITY AND STABILITY TESTING

Prior to sample distribution, randomly selected samples from each matrix (A, B, C, D and E) were analysed for homogeneity by Global Proficiency Ltd (New Zealand). Based on the results of this testing, the homogeneity of the samples was established.

Stability testing was also performed on the samples by Global Proficiency Ltd (New Zealand). The results showed that the samples were sufficiently stable for testing for the duration of the program.

For more information on the homogeneity and stability testing, see Appendix C.

6. FALSE RESULTS

Testing methods were pooled and results examined for laboratories reporting false positives and false negatives. The false positive and false negative results for this round of the program are summarised in the following table.

TABLE A: False Results
(by laboratory code number)

Presence / Absence of *Salmonella* in Whole Milk Powder		
Sample	False Positives	False Negatives
A	-	
B		-
C	-	
D		-
E		-
Presence / Absence of *Listeria* in Whole Milk Powder		
Sample	False Positives	False Negatives
A		-
B	5	
C		-
D		5
E		5
Presence / Absence of *L. monocytogenes* in Whole Milk Powder		
Sample	False Positives	False Negatives
A		-
B	-	
C		-
D	-	
E	-	

7. TECHNICAL COMMENTS

Response Rate

All seven of the laboratories that participated in the program submitted results for inclusion in the final report. All of these seven laboratories reported results for *Salmonella.* Five of the seven participants (71%) reported results for *Listeria* spp. Three of the seven participants (43%) reported results for *Listeria monocytogenes*.

Salmonella Results

The results submitted by participants for *Salmonella* are presented in Appendix A1.

There were no false results reported for any of the samples for *Salmonella*. Two laboratories reported using culture methods followed by the use of biochemical testing or rapid kits in the confirmatory testing processes. Culture techniques referenced included FDA-BAM (US Food and Drug Administration Bacteriological Analytical Manual) and ISO 6579:2002.

Two laboratories reported using the VIDAS® immunoassay system following cultural techniques (only one provided a reference for the culture technique employed; AS 5013-no further reference).

Three laboratories reported using a molecular technique following cultural procedures. Two of these laboratories reported using the 3M™ Molecular Detection System following enrichment using the following culture methods: AS5013.10:2004 – Microbiology of food and animal feeding stuffs – Horizontal method for the detection of *Salmonella* spp., which is equivalent to ISO 6579:2002/Cor.1:2004, in parallel with ISO 6785 – *Salmonella* in Milk and Milk Products for the detection and isolation of *Salmonella* species). Both laboratories reported undertaking confirmatory testing using biochemical and serological testing and rapid kits.

One further laboratory reported using the Thermofisher Piko Real-Time PCR system following enrichment using AS/ISO/internal methods, followed by a rapid kit to confirm isolates. The laboratory correctly identified that sample C contained *Citrobacter freundii*.

Detailed method information for *Salmonella* is provided in Appendix B1.

Listeria Results

The results submitted by participants for *Listeria* and *L. monocytogenes* are presented in Appendix A2.

Laboratory 5 reported a false positive result for sample B for *Listeria* spp. This laboratory reported a strong MDS positive result for sample B but could not obtain an isolate that was typical of *Listeria*. The laboratory judged the result as presumptive *Listeria*, but acknowledged that it could be a false positive. This sample contained Salmonella *Salford* and an Enterococcus species. Laboratory 5 also reported false negative results for samples D and E for *Listeria* spp. These samples contained *Listeria innocua*.

There were no false positive or false negatives results reported for any of the samples for *L. monocytogenes*, although laboratory 5 did not test sample B for *L. monocytogenes*.

One laboratory reported using the FDA-BAM (US Food and Drug Administration Bacteriological Analytical Manual) culture method but did not provide details of confirmatory testing undertaken.

A second laboratory reported using the VIDAS® immunoassay following the cultural technique (AS 5013-no further reference) for the detection and isolation of *Listeria* species. The laboratory did not provide details of the confirmatory testing processes undertaken.

Three laboratories reported using a molecular technique following cultural procedures. Two of the laboratories reported using the 3M™ Molecular Detection system and both referenced the cultural procedure used; AS 1766.2.15:1998 – Food Microbiology – Examination for specific organisms – *Listeria monocytogenes* in dairy products (this method has been superseded by AS 5013.24.1 (in-part)) for the detection and isolation of *Listeria* species; the second AS 5013.24.1-2009 Microbiology of food and animal feeding stuffs – Horizontal method for *Listeria monocytogenes*. The second laboratory (laboratory 5) reported undertaking confirmatory testing using biochemical testing, β-haemolysis and the CAMP test, so it is surprising that false results were obtained for three out of the five samples. The third laboratory referenced using AS / ISO + internal methods (version not provided) followed by the Thermofisher Piko Real-Time PCR system. The laboratory reported conducting confirmatory testing using a rapid kit and haemolysis to confirm isolates, and reported samples D and E contained *L. welshimeri*, when in fact they contained *L. innocua*. Biochemical testing using rapid kits containing the carbohydrate xylose should differentiate between species of *L. welshimeri* (positive xylose fermentation) and *L. innocua* (negative xylose fermentation).

Detailed method information for *Listeria* is provided in Appendix B2.

8. REFERENCES

1. *Guide to Proficiency Testing Australia (2016)*. (This document is located on the PTA website at www.pta.asn.au under Programs / Documents).
2. *AS 1766.2.15: 1998 Food microbiology – Examination for specific organisms – Listeria monocytogenes in dairy products.*
3. *AS 5013.10: 2009 Food microbiology – Microbiology of food and animal feeding stuffs – Horizontal method for the detection of Salmonella spp (ISO 6579: 2002, MOD).*
4. *AS 5013.24.1: 2009 Food microbiology – Microbiology of food and animal feeding stuffs – Horizontal method for the detection and enumeration of Listeria monocytogenes – Detection method (ISO 11290-1: 1996, MOD).*
5. *ISO 6579: 2002 Microbiology of food and animal feeding stuffs – Horizontal method for the detection of Salmonella spp.*
6. *ISO 6785: 2001 Milk and milk products – Detection of Salmonella spp.*
7. *ISO 11290-1: 1996 Microbiology of food and animal feeding stuffs – Horizontal method for the detection and enumeration of Listeria monocytogenes – Part 1: Detection method.*
8. *US Food and Drug Administration Bacteriological Analytical Manual (FDA-BAM) – Chapter 5: Salmonella (August 2016). Online version: https://www.fda.gov/Food/FoodScienceResearch/LaboratoryMethods/ucm070149.htm*
9. *US Food and Drug Administration Bacteriological Analytical Manual (FDA-BAM) – Chapter 10: Listeria monocytogenes (March 2017). Online version: https://www.fda.gov/Food/FoodScienceResearch/LaboratoryMethods/ucm071400.htm*

APPENDIX A

Summary of Results

Section A1

Salmonella

A1.1

Salmonella Results

Lab Code	A	B	C	D	E	False Results
1	Absent	Present	Absent	Present	Present	
2	Absent	Present	Absent	Present	Present	
3	Absent	Present	Absent	Present	Present	
4	Absent	Present	Absent	Present	Present	
5	Absent	Present	Absent	Present	Present	
6	Absent	Present	Absent	Present	Present	
7	Absent	Present	Absent	Present	Present	

A1.2

Salmonella Failure Rate

No. of Results	Sample					Total
	A	B	C	D	E	
False Results	0	0	0	0	0	0
Total Results	7	7	7	7	7	35

Failure rate (Sample A) = $\frac{\text{No. of False Results (A)}}{\text{Total No. of Results (A)}}$
= 0 / 7
= 0%

Failure rate (Sample B) = $\frac{\text{No. of False Results (B)}}{\text{Total No. of Results (B)}}$
= 0 / 7
= 0%

Failure rate (Sample C) = $\frac{\text{No. of False Results (C)}}{\text{Total No. of Results (C)}}$
= 0 / 7
= 0%

Failure rate (Sample D) = $\frac{\text{No. of False Results (D)}}{\text{Total No. of Results (D)}}$
= 0 / 7
= 0%

Failure rate (Sample E) = $\frac{\text{No. of False Results (E)}}{\text{Total No. of Results (E)}}$
= 0 / 7
= 0%

Overall failure rate (*Salmonella*) = $\frac{\text{Total No. of False Results}}{\text{Total No. of Results}}$
= 0 / 35
= 0%

Section A2

Listeria

A2.1

Listeria Results

Lab Code	A	B	C	D	E	False Results
2	Present	Absent	Present	Present	Present	
3	Present	Absent	Present	Present	Present	
4	Present	Absent	Present	Present	Present	
5	Present	**Present**	Present	**Absent**	**Absent**	**3**
6	Present	Absent	Present	Present	Present	

Notes:

1. A highlighted result (*i.e.* bold print) is a false result and should be investigated.
2. Laboratory 5 reported a strong MDS positive result for sample B but could not obtain an isolate that was typical of *Listeria*. This result was judged as presumptive *Listeria*, although it was acknowledged that it could be a false positive result.

A2.2

Listeria Failure Rate

No. of Results	Sample					Total
	A	B	C	D	E	
False Results	0	1	0	1	1	3
Total Results	5	5	5	5	5	25

Failure rate (Sample A) = $\frac{\text{No. of False Results (A)}}{\text{Total No. of Results (A)}}$
= 0 / 5
= 0%

Failure rate (Sample B) = $\frac{\text{No. of False Results (B)}}{\text{Total No. of Results (B)}}$
= 1 / 5
= 20.0%

Failure rate (Sample C) = $\frac{\text{No. of False Results (C)}}{\text{Total No. of Results (C)}}$
= 0 / 5
= 0%

Failure rate (Sample D) = $\frac{\text{No. of False Results (D)}}{\text{Total No. of Results (D)}}$
= 1 / 5
= 20.0%

Failure rate (Sample E) = $\frac{\text{No. of False Results (E)}}{\text{Total No. of Results (E)}}$
= 1 / 5
= 20.0%

Overall failure rate (*Listeria)* = $\frac{\text{Total No. of False Results}}{\text{Total No. of Results}}$
= 3 / 25
= 12.0%

A2.3

Listeria monocytogenes Results

Lab Code	A	B	C	D	E	False Results
3	Present	Absent	Present	Absent	Absent	
4	Present	Absent	Present	Absent	Absent	
5	Present	Not done	Present	Absent	Absent	

A2.4

Listeria monocytogenes Failure Rate

No. of Results	Sample					Total
	A	B	C	D	E	
False Results	0	0	0	0	0	0
Total Results	3	2	3	3	3	14

Failure rate (Sample A) = $\frac{\text{No. of False Results (A)}}{\text{Total No. of Results (A)}}$

= 0 / 3

= 0%

Failure rate (Sample B) = $\frac{\text{No. of False Results (B)}}{\text{Total No. of Results (B)}}$

= 0 / 2

= 0%

Failure rate (Sample C) = $\frac{\text{No. of False Results (C)}}{\text{Total No. of Results (C)}}$

= 0 / 3

= 0%

Failure rate (Sample D) = $\frac{\text{No. of False Results (D)}}{\text{Total No. of Results (D)}}$

= 0 / 3

= 0%

Failure rate (Sample E) = $\frac{\text{No. of False Results (E)}}{\text{Total No. of Results (E)}}$

= 0 / 3

= 0%

Overall failure rate (*L. monocytogenes)* = $\frac{\text{Total No. of False Results}}{\text{Total No. of Results}}$

= 0 / 14

= 0%

APPENDIX B

Summary of Methods

SECTION B1

Salmonella

Lab Code	***Salmonella* Method Information**	
	Detection	Confirmation
1	Rapid Method - Immunoassay (VIDAS)	-
2	Culture Method (FDA BAM)	API 20E rapid kit
3	Culture Method (AS 5013), Rapid Method - Immunoassay (VIDAS)	-
4	Culture Method (AS / ISO + internal methods), Molecular Technique (Thermofisher Piko Real-Time PCR)	API 20E rapid kit
5	Culture Method (AS 5013.10 / ISO 6785), Molecular Technique (3M Molecular Detection System)	Biochemical tests, API 20E rapid kit, O & H serotyping
6	Culture Method (AS 5013.10 and ISO 6785), Molecular Technique (3M™ Molecular Detection System Version 1 and Version 2)	API 20E rapid kit, O serotyping, O & H serotyping
7	Culture Method (ISO 6579: 2002)	Biochemical tests

Notes:

1. Laboratory 4 reported that sample C contained *Citrobacter freundii*.

SECTION B2

Listeria

B2.1

Lab Code	***Listeria* Method Information**	
	Detection	Confirmation
2	Culture Method (FDA BAM)	-
3	Culture Method (AS 5013), Rapid Method - Immunoassay (VIDAS)	-
4	Culture Method (AS / ISO + internal methods), Molecular Technique (Thermofisher Piko Real-Time PCR)	β haemolysis, Listeria API ID rapid kit
5	Culture Method (AS 5013.24.1 - 2009), Molecular Technique (3M Molecular Detection System)	Biochemical tests, CAMP test, β haemolysis
6	Culture Method (AS 1766.2.15: 1998), Molecular Technique (3M™ Molecular Detection System Version 1 and Version 2)	-

Notes:

1. Laboratory 4 reported that samples D and E contained *Listeria welshimeri*.

APPENDIX C

Homogeneity and Stability Testing

HOMOGENEITY TESTING RESULTS

Five samples from each matrix (A, B, C, D and E) were randomly chosen and tested by Global Proficiency Ltd (New Zealand) to confirm that the samples were homogeneous. The results were analysed prior to sample dispatch.

For *Salmonella*, the method of testing was enumeration via spread plate technique using XLD agar. The samples were verified using ISO 6579: 2002 (E). For *Listeria*, the method of testing was enumeration via spread plate technique using PALCAM agar. The samples were verified using ISO 11290-1: 1996 / Amdt 1: 2004.

The results are tabulated below.

Sample A (containing *Listeria monocytogenes*)			
Sample	*Salmonella*	*Listeria*	*Listeria monocytogenes*
34	Not detected	Detected	Detected
40	Not detected	Detected	Detected
112	Not detected	Detected	Detected
135	Not detected	Detected	Detected
176	Not detected	Detected	Detected

Sample B (containing *Salmonella* Salford)			
Sample	*Salmonella*	*Listeria*	*Listeria monocytogenes*
12	Detected	Not detected	Not detected
14	Detected	Not detected	Not detected
15	Detected	Not detected	Not detected
16	Detected	Not detected	Not detected
17	Detected	Not detected	Not detected

Sample C (containing *Listeria monocytogenes*)			
Sample	*Salmonella*	*Listeria*	*Listeria monocytogenes*
10	Not detected	Detected	Detected
50	Not detected	Detected	Detected
106	Not detected	Detected	Detected
302	Not detected	Detected	Detected
303	Not detected	Detected	Detected

Sample D (containing *Salmonella* Senftenberg and *Listeria innocua*)			
Sample	*Salmonella*	*Listeria*	*Listeria monocytogenes*
5	Detected	Detected	Not detected
8	Detected	Detected	Not detected
14	Detected	Detected	Not detected
16	Detected	Detected	Not detected
22	Detected	Detected	Not detected

Sample E (containing *Salmonella* Adelaide and *Listeria innocua*)			
Sample	*Salmonella*	*Listeria*	*Listeria monocytogenes*
4	Detected	Detected	Not detected
10	Detected	Detected	Not detected
14	Detected	Detected	Not detected
22	Detected	Detected	Not detected
23	Detected	Detected	Not detected

Based on the above testing results, the homogeneity of the samples was established.

STABILITY TESTING RESULTS

To determine whether the samples used for this program were stable, three samples from each matrix (A, B, C, D and E) were randomly chosen and stored at ambient temperature for 4 days. Samples were then tested (using the same media as detailed in the homogeneity section) by Global Proficiency Ltd (New Zealand). The results are tabulated below.

Sample A (containing *Listeria monocytogenes*)			
Sample	*Salmonella*	*Listeria*	*Listeria monocytogenes*
78	Not detected	Detected	Detected
97	Not detected	Detected	Detected
156	Not detected	Detected	Detected

Sample B (containing *Salmonella* Salford)			
Sample	*Salmonella*	*Listeria*	*Listeria monocytogenes*
2	Detected	Not detected	Not detected
23	Detected	Not detected	Not detected
35	Detected	Not detected	Not detected

Sample C (containing *Listeria monocytogenes*)			
Sample	*Salmonella*	*Listeria*	*Listeria monocytogenes*
17	Not detected	Detected	Detected
152	Not detected	Detected	Detected
216	Not detected	Detected	Detected

Sample D (containing *Salmonella* Senftenberg and *Listeria innocua*)			
Sample	*Salmonella*	*Listeria*	*Listeria monocytogenes*
2	Detected	Detected	Not detected
7	Detected	Detected	Not detected
11	Detected	Detected	Not detected

Sample E (containing *Salmonella* Adelaide and *Listeria innocua*)			
Sample	*Salmonella*	*Listeria*	*Listeria monocytogenes*
13	Detected	Detected	Not detected
18	Detected	Detected	Not detected
19	Detected	Detected	Not detected

Based on these results, the samples were considered to be stable during the period that this proficiency testing program was conducted.

APPENDIX D

Instructions to Participants
and
Results Sheets

D1.1

PROFICIENCY TESTING AUSTRALIA
PATHOGENS IN FOOD PROGRAM – ROUND 35

INSTRUCTIONS TO PARTICIPANTS

On receipt of samples:

Open the container immediately and check the contents are in order

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

Prior to testing please note:

- Five samples (labelled A, B, C, D, E) each containing 60 g of whole milk powder are to be tested for the presence / absence of *Salmonella* and *Listeria* as per instructions below.
- Samples are for laboratory use only.
- Store your samples in the original packaging between 2-5 °C until testing commences.
- It is strongly recommended that testing is initiated within 48 hours of receipt of the samples.
- Where practical your laboratory is encouraged to test different samples using different analysts.
- Laboratories should perform all testing using their routine test methods.
- *Listeria* speciation is not mandatory, but is encouraged.
- *Salmonella* serotyping is not required.
- Your laboratory has been allocated the code number shown on the attached Results and Method Information Sheets.

Instructions

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

1. Re-hydrate the freeze-dried matrix by adding 3.0 mL of sterile diluent (*e.g.* 0.1% (w/v) peptone and 0.85% (w/v) NaCl (ISO 6887-1)) at room temperature.
2. Allow standing at room temperature for 10 minutes.
3. Mix the vial contents using a vortex mixer for 15 seconds.
4. Aseptically open the sachets. Weigh out 25 g for each of the *Salmonella* and *Listeria* tests to be performed. Add 225 mL enrichment broth. Mix to dissolve the milk powder. Add 1 mL of the rehydrated vial contents and continue as per your Standard method.
5. Proceed as per your laboratory test method.
6. Report results as presence or absence per 25 gram of sample in Table A of the supplied Results Sheets by filling in (•) in the appropriate circles. If *Salmonella* or *Listeria* are not detected in a sample then this should be indicated by filling in (•) in the circle alongside “absent”.
7. Report all method information in Tables B and C of the supplied Results Sheets by filling in (•) in the appropriate circles. If more than one method is used for a test report each result separately (copy and use a separate Results Sheet for each method).

Please return results **no later than Friday 21 April 2017** to:

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Silverwater NSW 2128
AUSTRALIA

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D2.1

PTA Pathogens in Food (Round 35) Proficiency Testing Program

RESULTS SHEET

Date samples arrived	Sample temperature	Date testing began	Signature

Laboratory Code:

Table A: Results

Test	Sample A	Sample B	Sample C	Sample D	Sample E
Salmonella	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done
Listeria	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done
Listeria monocytogenes	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done	❍ Present ❍ Absent ❍ Not done

Table B: Method Information: *Salmonella*

Laboratory Code ☐

Please indicate the Method Information used by filling in (●) in the appropriate circles below:

Detection	**Confirmation**
❍ **Culture Method** (please specify method reference) _____ ❍ **Rapid Methods - Immunoassay** ❍ TECRA ❍ VIDAS ❍ Other (please specify) _____ ❍ **Molecular Techniques** (please specify system used) ❍ PCR_____ ❍ DNA probe_____ ❍ Other (please state) _____	❍ Biochemical tests ❍ Rapid kits ❍ API 20E ❍ Microbact 12E ❍ Other (please specify) _____ ❍ Serotyping ❍ O ❍ O & H ❍ Agglutination testing (please specify kit) _____ ❍ Other (please specify) _____

Comments: _____

_____

_____

Table C: Method Information: *Listeria*

Laboratory Code ☐

Please indicate the methodology used by filling in (●) in the appropriate circles below:

Detection	Confirmation
❍ **Culture Method** (please specify method reference) _____ ❍ **Rapid Methods - Immunoassay** ❍ TECRA ❍ VIDAS ❍ Other (please specify) _____ ❍ **Molecular Techniques** (please specify system used) ❍ PCR_____ ❍ DNA probe_____ ❍ Other (please state) _____	❍ Biochemical tests ❍ CAMP test ❍ β-haemolysis ❍ Rapid kits ❍ *Listeria* API ID ❍ Microbact 12L ❍ Other (please specify) _____ ❍ Serological testing (please specify) _____ ❍ Other (please specify) _____

Comments: _____

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