

NF VALIDATION
Validation of alternative analytical methods
Application in food microbiology

Summary report
Validation study according to the EN ISO 16140-2:2016

3M™ Petrifilm™ Coliform Count (CC) Plate
(Certificate number: 3M 01/02 - 09/89 B)
for the enumeration of gas producing coliforms
in all human food (except raw shellfish)








Quantitative method

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This report consists of 58 pages, including 7 appendices.
Only copies including the totality of this report are authorized.

Competencies of the laboratory are certified by COFRAC accreditation for the analyses marked with the symbol♦.

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Quality Assurance documents related to this study can be consulted upon request from **3M Health Care**.

Measurement uncertainty on the reference method results is not taken into account to provide the conclusion in this report; this measurement uncertainty is however available.

The technical protocol and the result interpretation were realized according to the EN ISO 16140-2:2016 and the AFNOR technical rules (PR Revision 7).

Validation protocols	<ul style="list-style-type: none"> ▪ ISO 16140-1 (2016): Microbiology of the food chain - Method validation — <i>Part 1: Vocabulary</i> ▪ ISO 16140-2 (2016): Microbiology of the food chain - Method validation — <i>Part 2: Protocol for the validation of alternative (proprietary) methods against a reference method</i> ▪ AFNOR technical rules (PR Revision 7).
Reference method[♦]	NF ISO 4831 (October 2006) - Microbiology of food and animal feeding stuffs - Horizontal method for the detection and enumeration of coliforms - Most probable number technique
Alternative method	3M™ Petrifilm™ Coliform Count (CC) Plate (B)
Scope	All human food (except raw shellfish) by performing assays on a broad range of products
Certification organism	AFNOR Certification (http://nf-validation.afnor.org/)

♦ Analyses performed according to the COFRAC accreditation

1 INTRODUCTION

The **3M™ Petrifilm™ Coliform Count (CC) Plate** was validated on September 1989 (Certificate number: 3M 01/02 - 09/89 B) for the **enumeration of gas producing coliforms** in all human food (except raw shellfish) by performing assays on a broad range of products. A summary of the different validation studies is listed below:

Date	Study	Validation standard	ISO method
September 1989	Initial validation	/	ISO 4831 (1991)
September 1993	Renewal study	/	ISO 4831 (1991)
June 1998	Renewal study - ADRIA	/	ISO 4831 (1991)
May 2002	Renewal study - ADRIA	/	ISO 4831 (1991)
December 2005	Renewal study - ADRIA	EN ISO 16140 (2003)	ISO 4831 (1991)
April 2010	Renewal study - ADRIA	EN ISO 16140 (2003)	ISO 4831 (2006)
March 2014	Renewal study - ADRIA	EN ISO 16140 (2003)	ISO 4831 (2006)
June 2018	Renewal study - ADRIA	EN ISO 16140-2 (2016)	ISO 4831 (2006)
April 2022	Renewal study - ADRIA	EN ISO 16140-2 (2016)	ISO 4831 (2006)

2 METHODS DESCRIPTION

2.1 Alternative method

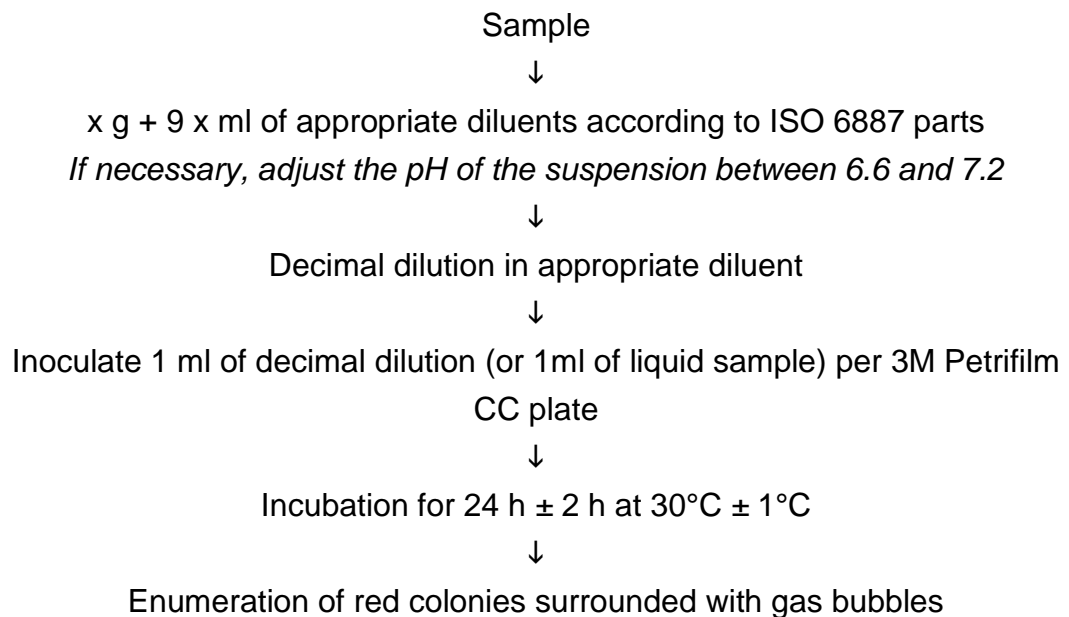
2.1.1 Principle

The 3M™ Petrifilm™ Coliform Count (CC) Plate is a sample-ready-culture medium system which contains modified Violet Red Bile (VRB) nutrients and selective agents, a cold-water-soluble gelling agent, and a tetrazolium indicator that facilitates colony enumeration.

2.1.2 Protocol

The flow diagram is described Figure 1.

**Figure 1 - Flow diagram of the 3M™ Petrifilm™ Coliform Count (CC) Plate
Gas producing coliform enumeration**



Note: the analysis at 30°C of raw shell-fish is excluded from the scope of the validation.

The method can be used at 30°C and 37°C. The user needs to pay attention on the fact that the results obtained are not necessarily the same at 30°C and 37°C. The NF Validation mark is granted for use at 30°C and 37°C, but the study was run only at 30°C.

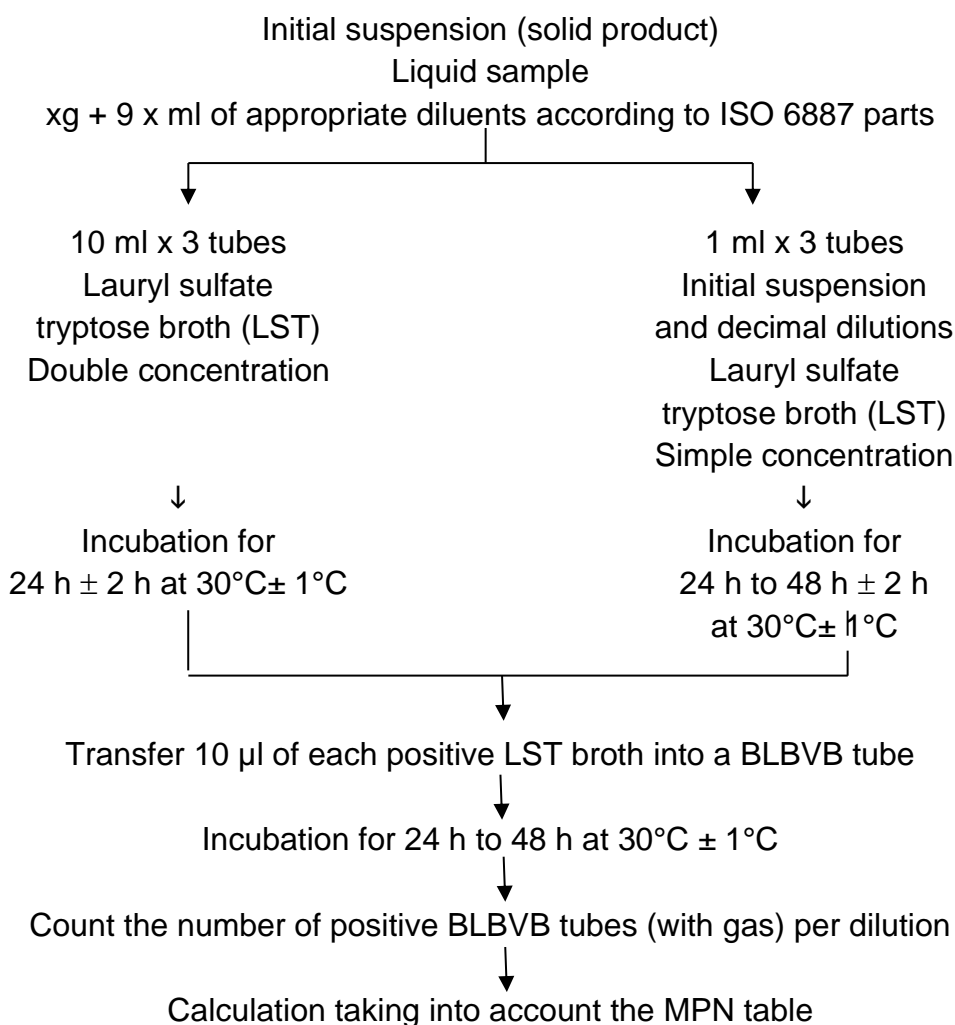
2.1.3 Restrictions

There is no restriction

2.2 Reference method♦

The reference method corresponds to the NF ISO 4831 (October 2006) - Microbiology of food and animal feeding stuffs - Horizontal method for the detection and enumeration of coliforms - Most probable number technique (See Figure 2).

**Figure 2 - Flow diagram of the reference method: NF ISO 4831
Horizontal method for the detection and enumeration of coliforms.
Most probable number technique**



♦ Analysis performed according to the COFRAC accreditation

3 INITIAL VALIDATION, EXTENSION/RENEWAL STUDIES: RESULTS

3.1 Method Comparison Study

The method comparison study is a study performed by the expert laboratory to compare the alternative method with the reference method.

The study was carried out on a diversity of samples and strains representative of agri-food products. This does not constitute an exhaustive list of the different matrices included in the scope.

For any comment on the alternative method, please contact AFNOR Certification at <http://nf-validation.afnor.org/contact-2/>.

3.1.1 Relative trueness study

The relative trueness is the degree of correspondence between the response obtained by the reference method and the response obtained by the alternative method on identical samples.

3.1.1.1 Number and nature of the samples

Five food categories were tested. Taking into account all the studies, the repartition of the analyzed samples and interpretable results per category and type is provided in Table 1.

Table 1 – Categories and types

Category		Types		Number of samples tested	Number of results available
1	Meat products	a	Raw meats	15	15
		b	Ready to eat, ready to reheat	19	18
		c	Delicatessen	17	15
		Total		51	48
2	Dairy products	a	Milk	8	6
		b	Cheeses and fermented milks	14	14
		c	Creams, milk powders	10	6
		Total		32	26
3	Egg products and egg-based products and pastries	a	Liquid egg, eggs	5	5
		b	Pastries	5	5
		c	Egg based products	8	7
		Total		18	17
4	Seafood products	a	Raw fish	15	7
		b	RTE	5	5
		c	RTRH	5	5
		Total		25	17
5	Vegetables	a	Raw and frozen	10	9
		b	RTE	6	5
		c	RTRH, RTC	8	5
		Total		24	19
All categories				150	127

150 samples were analyzed: 129 in 1997 and 1998 and 21 for the renewal study in 2018, leading to 127 exploitable results.

3.1.1.2 Artificial and natural contamination of the samples

Artificial contaminations were realized by seeding protocols. The inoculated strains, the contamination protocols are provided in **Appendix 1**.

17 samples were artificially contaminated; 9 samples provided interpretable results by both methods.

116 samples which gave interpretable results by both methods were naturally contaminated.

91.3 % of the samples giving interpretable results by both methods were naturally contaminated.

3.1.1.3 Raw data

The raw data are provided in **Appendix 2**.

The samples were analyzed by the reference and the alternative methods in order to have 15 interpretable results per category, and 5 interpretable results per type.

One replicate was tested for the renewal study while two replicates were tested for the previous studies. Only the results from replicate 1 were kept for interpretation.

The data are classified in three categories (See Table 2):

- Interpretable results with the reference and the alternative methods;
- Results with less than 4 colonies per plate with the reference and/or the alternative method (indicated with “*” in the data) in order to have a more precise result. These results were not included in the calculation.
- Results below or above the quantification limit: according to the ISO 16140-2:2016, if any result (either reference or alternative method) is below the quantification limit, the data should be plotted using a substituted value of 1 log₁₀ units less than the observed value in case of a lower than value. Similarly, any value greater than the upper limit should be amended by adding 1 log unit. These results are not included in the calculations but also appear on the graphs.

Table 2 - Classification of the data

	Category	Number of samples analyzed	Number of samples with less than 4 colonies per plate	Number of samples with results below or above the quantification limit	Number of samples providing interpretable results by the reference and the alternative method
1	Meat products	51	2	1	48
2	Dairy products	32	6	0	26
3	Egg products and egg-based products and pastries	18	1	0	17
4	Seafood products	25	1	7	17
5	Vegetables	24	1	4	19
	All categories	150	11	12	127

The samples, which were not used in the calculations, are provided in Table 3.

Table 3 - Samples which were not used in the calculations

Sample N°	Product	ISO 4831 [♦]	3M Petrifilm CC (Gas producing)	Category	Type
7*	RTRH (pizza)	0,56	1,00*	1	b
14*	Rillettes	1,04	1,00*	1	c
58*	Ham	>3,04	3,78	1	c
151	Raw milk	1,81	1,00*	2	a
152	Raw milk	2,18	1,30*	2	a
140	Iced nougat	1,88	1,30*	2	c
141	Iced nougat	1,38	1,00*	2	c
142	Iced nougat	1,97	1,00*	2	c
90*	Ice cream	1,97	1,30*	2	c
51**	Cream	1,56	1,00*	3	c
36*	Seafood cocktail	1,18	1,30*	4	a
1165	Raw fish fillet	<0,49	<1,00	4	a
1927	Fish fillet	<1,49	<3,00	4	a
1928	Salmon fillet	>3,04	4,45	4	a
2125	Raw fish fillet	<0,49	<2,00	4	a
1164	Raw fish fillet	1,30	<1,00	4	a
1166	Raw fish fillet	0,87	<1,00	4	a
2124	Raw fish fillet	2,18	<3,00	4	a
1934	RTE (Macédoine)	<0,49	<2,00	5	b
75*	Peas	1,88	1,00*	5	a
2121	RTE (Grated carrots)	<0,49	4,32	5	c
2122	RTRH (falafels)	>4,04	4,81	5	c
1719	Spinach with cream	1,32	<1,00	5	c

3.1.1.4 Statistical interpretation

The calculations are provided in **Appendix 3**.

The obtained data were analyzed using the scatter plot. The graphs are provided with the line of identity ($y = x$).

The Figures 3 to 7 show the data plotted for each individual category.

The Figure 8 shows the data plotted for all the products.

♦ Analyses performed according to the COFRAC accreditation

Figure 3 - Data plotted for the **Meat products**

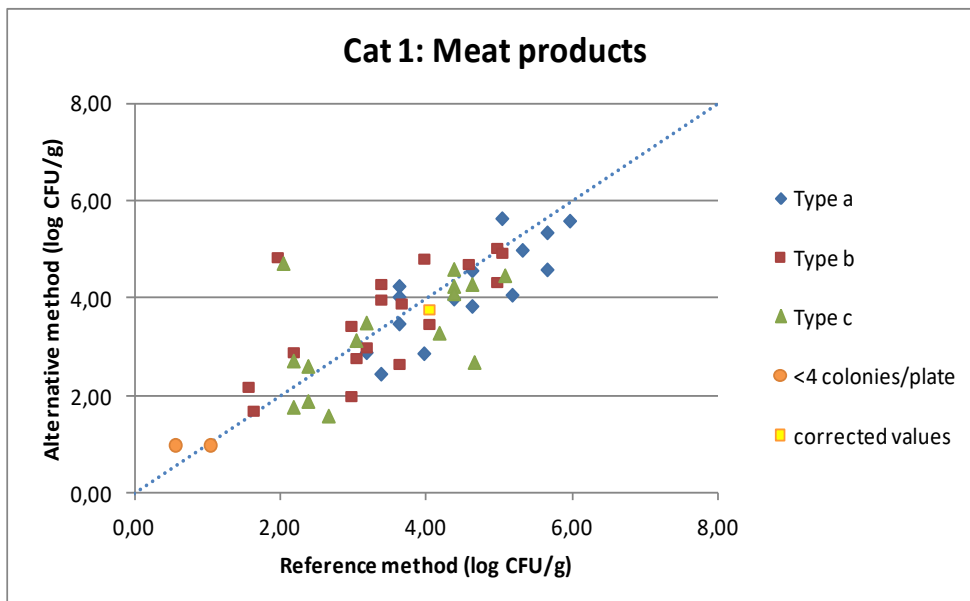


Figure 4- Data plotted for **Dairy products**

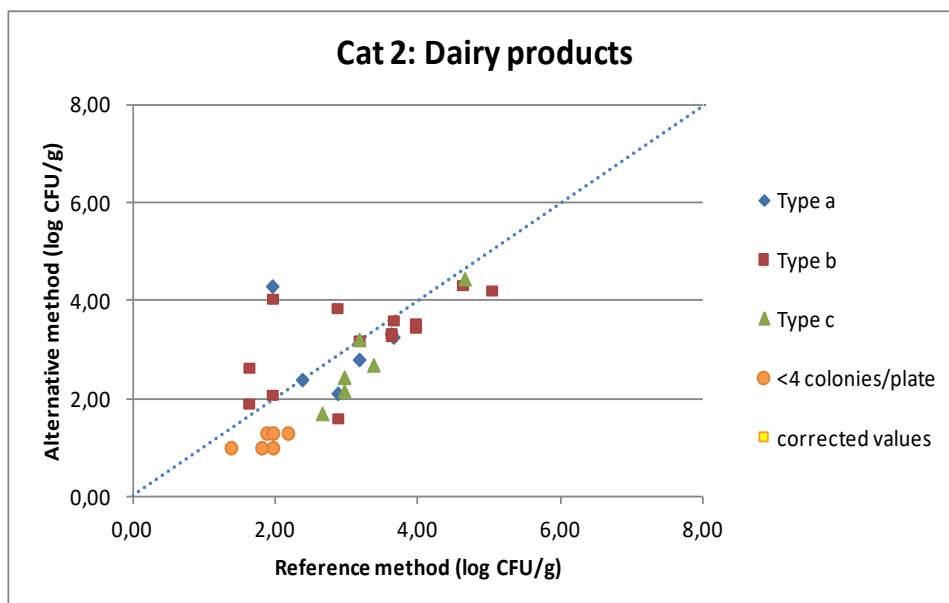


Figure 5- Data plotted for **Egg products and egg based products and pastries**

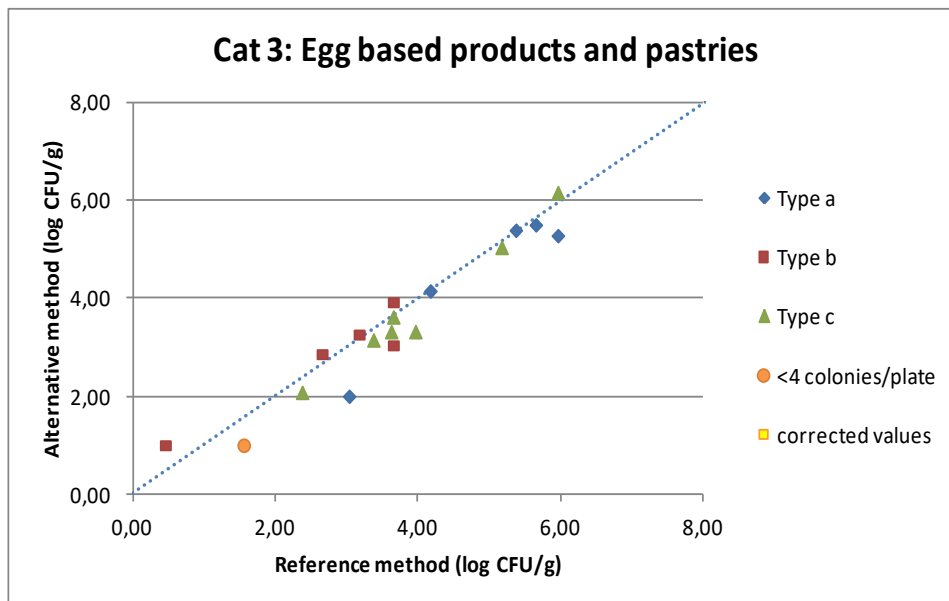


Figure 6- Data plotted for **Seafood products**

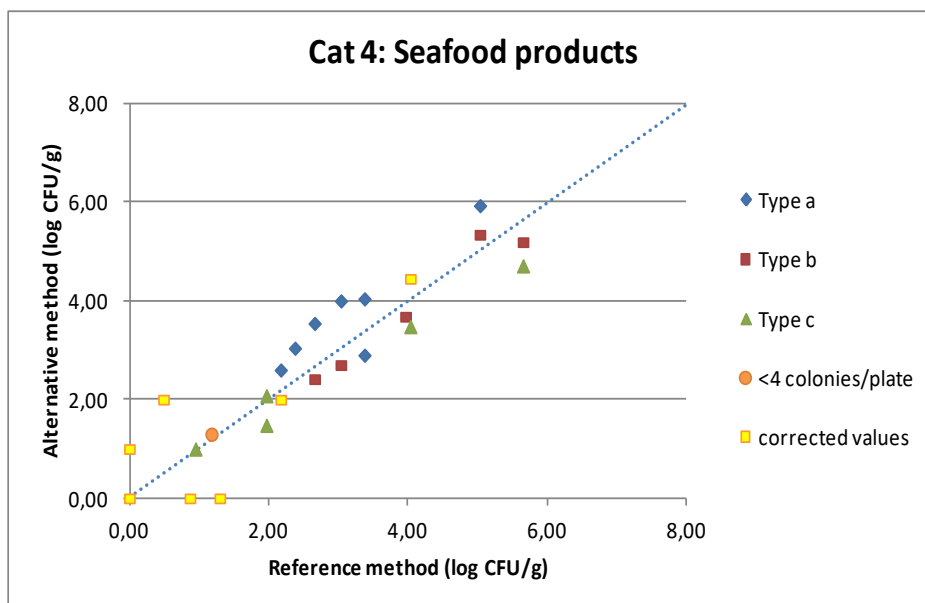


Figure 7- Data plotted for **Vegetables**

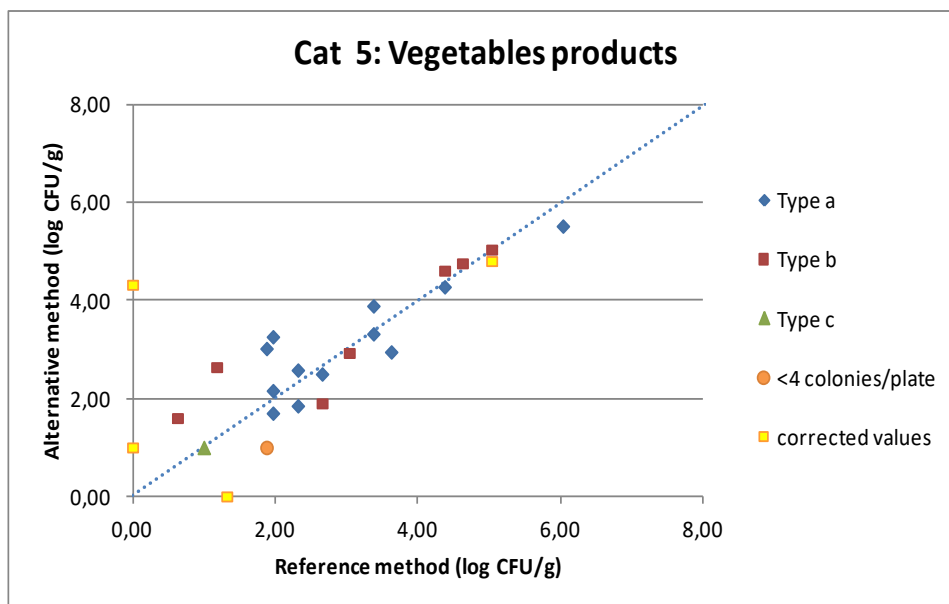
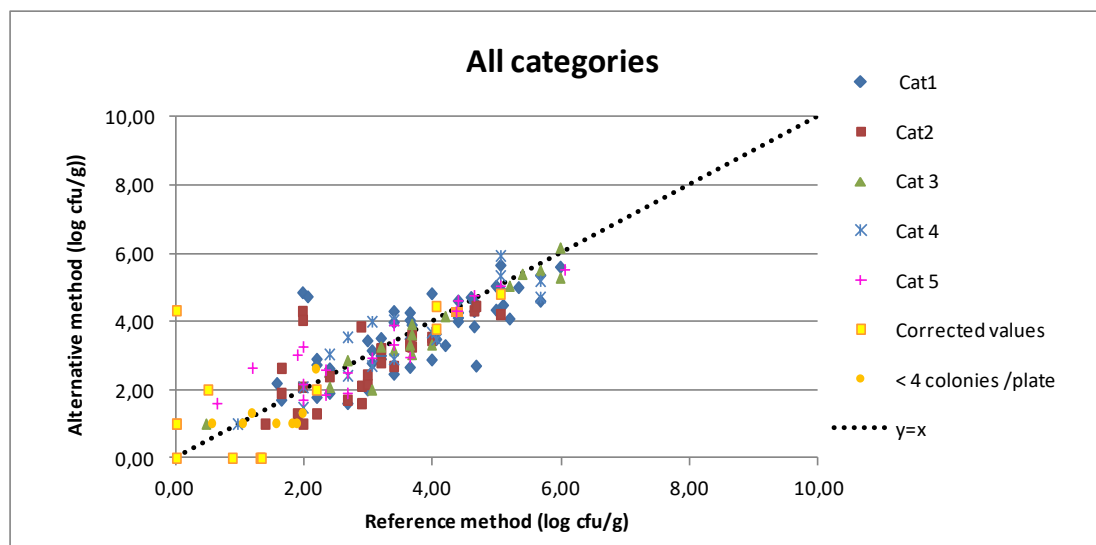


Figure 8 - Data plotted for **all the products**



The calculated values for Average difference and Standard deviation differences per category are provided in Table 4.

Table 4 - Calculated values

Category	n	\bar{D} (linear bias)	SD	95% lower limit	95% upper limit
1 Meat products	48	-0,06	0,85	-1,80	1,68
2 Dairy products	26	-0,17	0,82	-1,88	1,54
3 Egg products, egg based products and pastries	17	-0,17	0,40	-1,05	0,70
4 Seafood products	17	0,07	0,60	-1,24	1,39
5 Vegetables	19	0,16	0,65	-1,24	1,56
All categories	127	-0,05	0,74	-1,53	1,43

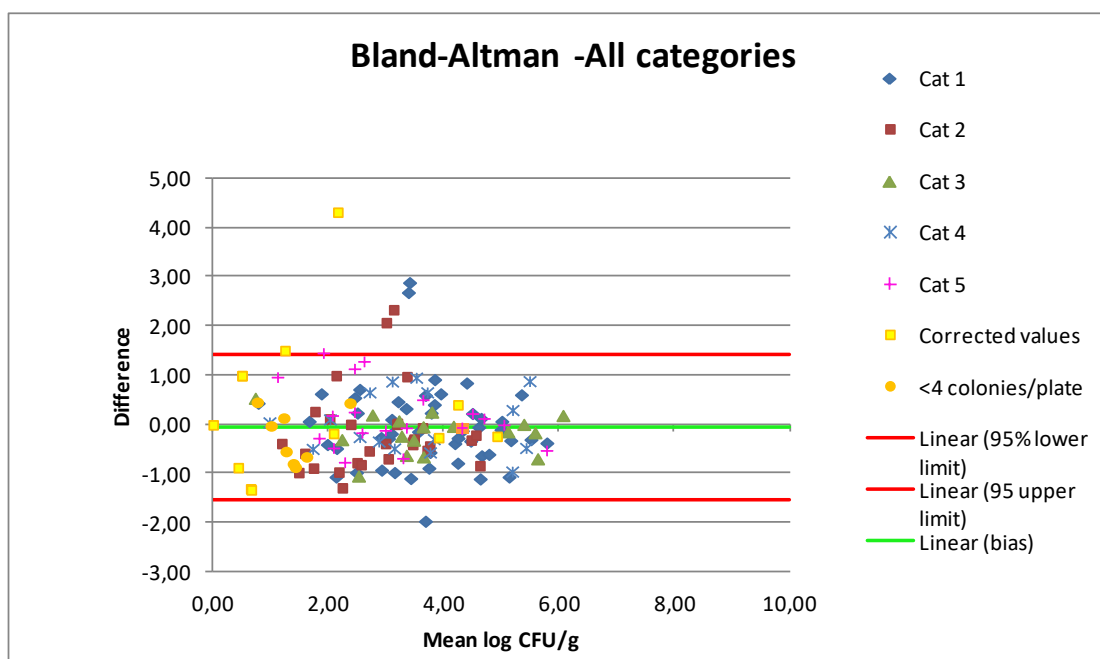
\bar{D} : Average difference

SD: Standard deviation of differences

The bias varies from - 0.17 log (dairy products and egg products) to 0.16 log (vegetables).

The Bland-Altman difference plot for all the samples is given Figure 9.

Figure 9 – Bland-Altman difference plot for all the samples



Samples for which the difference between the result observed with the reference and the alternative methods is above or lower than the limits are listed in Table 5.

Table 5 - Disagreements observed between the reference and the alternative method

Values in **green**: differences in favor of the alternative method

Values in **red**: differences in favor of the reference method

	Corrected value
	Results calculated using enumeration lower than 4 CFU/plate

Classification of data	Category	Type	N° Sample	ISO 4831	3M Petrifilm CC Gas producing coliforms	Values before correction (Reference or/and alternative method)	Mean	Difference	Lower / Upper limits	ISO 4832 result	Comments
Interpretable results by both methods	1	b	27*	1,96	4,85	/	3,41	2,89	-1,53 / 1,43	5,63	Higher enumeration by the alternative method
	1	c	9*	2,04	4,73	/	3,39	2,69		5,16	Higher enumeration by the alternative method
	2	a	119	1,96	4,30	/	3,13	2,34		4,76	Higher enumeration by the alternative method
	2	b	2251	1,96	4,04	/	3,00	2,08		/	Higher enumeration by the alternative method (inoculated with <i>E. kobei</i> Ad706)
	5	c	21*	1,18	2,64	/	1,91	1,46		2,37	Higher enumeration by the alternative method
	1	c	175	4,66	2,70	/	3,68	-1,96		3,86	Higher enumeration by the reference method
< or > the quantification limit	5	c	2121	0,00	4,32	1,00	2,16	4,32	/	Higher enumeration by the alternative method (inoculated with <i>C. sakazakii</i> 138)	

3.1.1.5 Discordant results

The samples are classified in three categories (See Table 6).

Table 6 - Classification of the samples

		Number of samples
Interpretable results by both methods	< LCL	1
	> UCL	5
	Total	6
<4 CFU/plate	< LCL	0
	> UCL	0
	Total	0
< or > the quantification limit	< LCL	0
	> UCL	1
	Total	1
Total < LCL		1
Total >UCL		6
TOTAL		7

There are more samples giving higher enumeration results with the alternative method than with the reference method.

For 4 samples giving higher enumeration with the Petrifilm Coliform Count plate, the results using the ISO 4832 were available. They are indicated in Table 5 for information.

The values obtained for the Petrifilm CC plate and the ISO 4832 method are comparable, confirming that the colonies associated with gas bubbles correspond to coliform colonies.

For one sample (2251), artificial contamination was done using *Enterobacter* Kobei Ad706; this strain was tested in the inclusivity study and produced gas when grown in BLBVB.

3.1.1.6 Conclusion

**The relative trueness study of the alternative method is satisfying.
The alternative method is reliable when compared to the reference method.**

3.1.2 Accuracy profile study

The accuracy profile is a graphical representation of the capacity of measurement of the quantitative method, obtained by combining acceptability intervals and β -expectation tolerance intervals, both reported to different levels of the reference value.

3.1.2.1 Matrices

Five matrices were tested. A minimum of one type per category and two different batches was selected, using six samples per type. Two samples were contaminated at a low level, two at intermediate level, and two at a high level. For each sample, five replicates (five different test portions) were tested. The tested categories, types, matrix and inoculated strains are provided in Table 7.

Table 7 - Categories, types and matrices

Category		Type	Matrix	Inoculated strain	Origin	Inoculation level (CFU/g)
1	Meat products	a - Raw meat	Ground beef	<i>Enterobacter cloacae</i> 58	Unknown	300 10 000 100 000
2	Dairy products	a - Milk	Pasteurized milk	<i>Cronobacter sakazakii</i> 95	Cheese	
3	Egg products and egg based products and pastries	a - Liquid egg	Pasteurized liquid whole egg	<i>Klebsiella pneumoniae</i> 89	Wiped cream	
4	Seafood products	a - Raw fish	Raw fish fillet	<i>Escherichia coli</i> Ad228	Fish	
5	Vegetables	a - Raw and frozen	Green peas	<i>Escherichia coli</i> 19	Grated carrots	

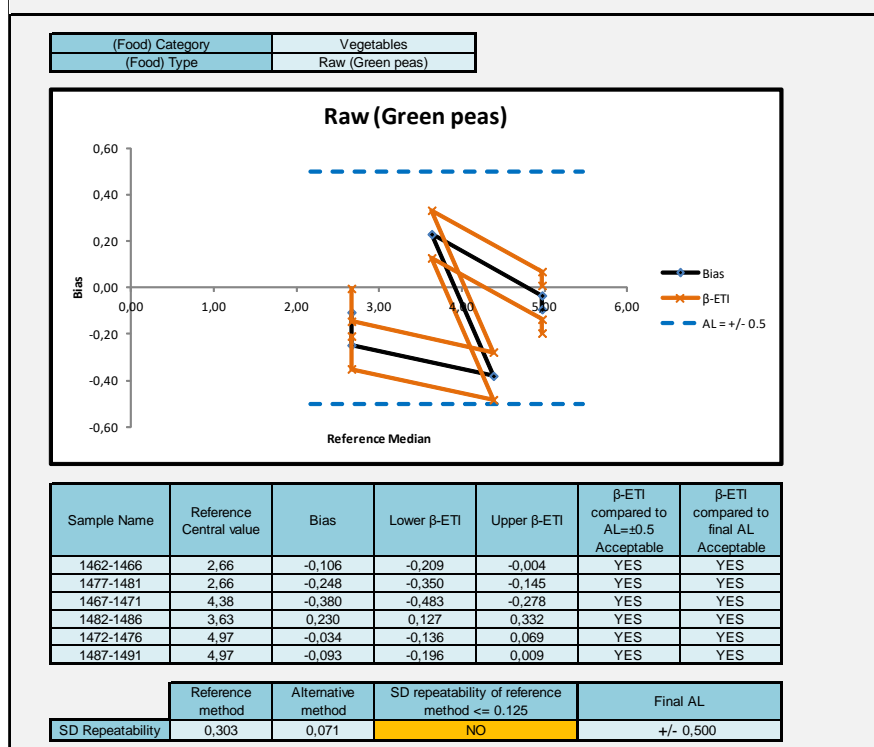
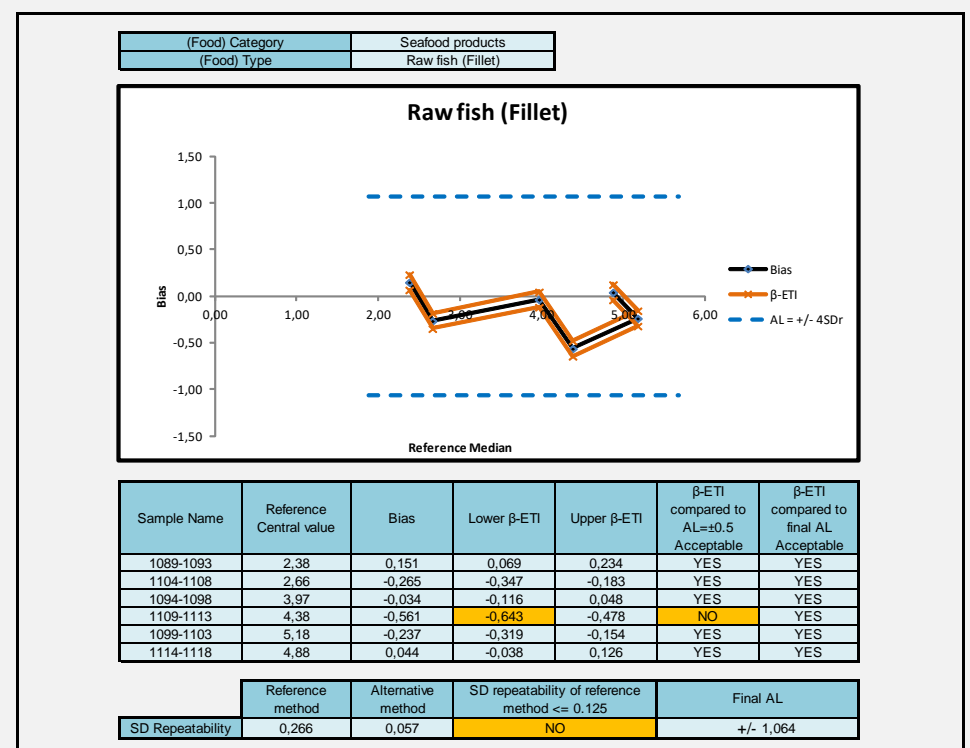
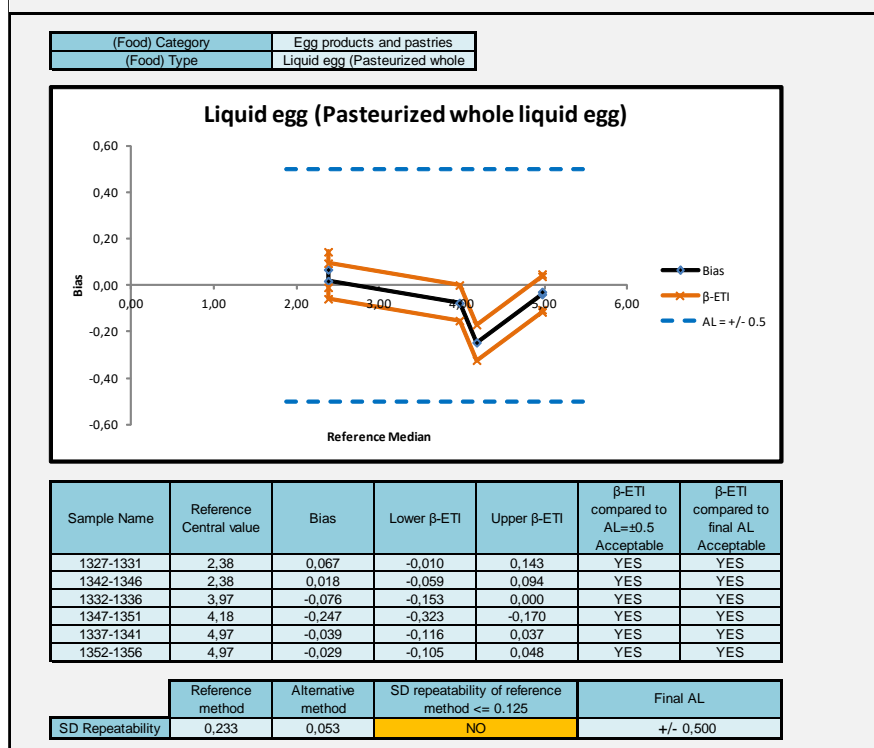
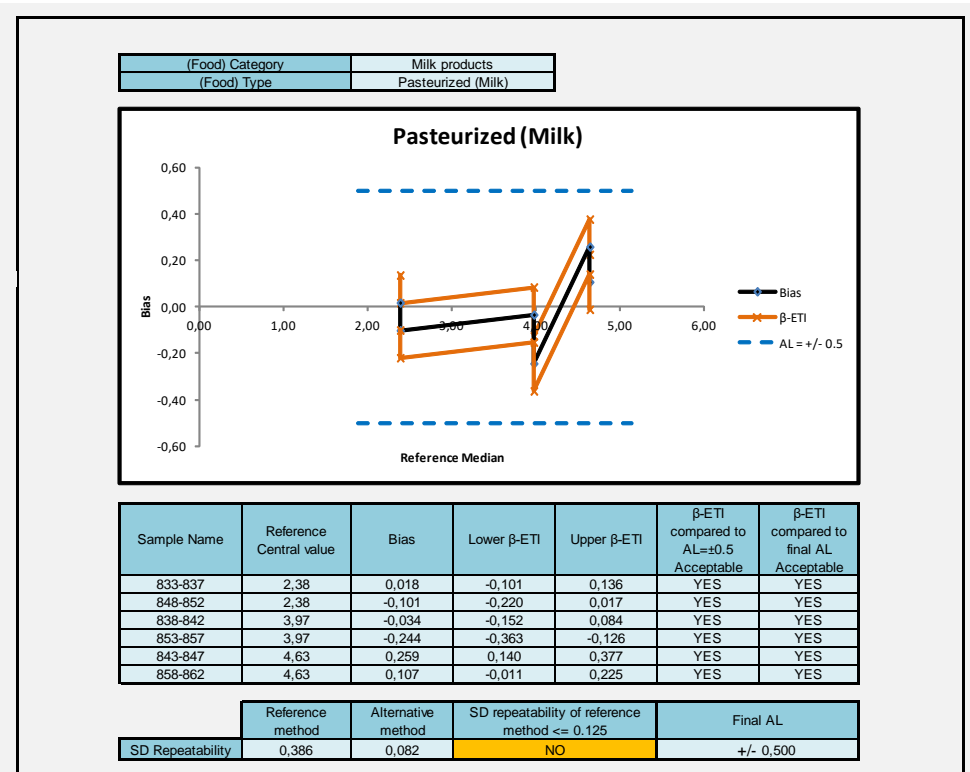
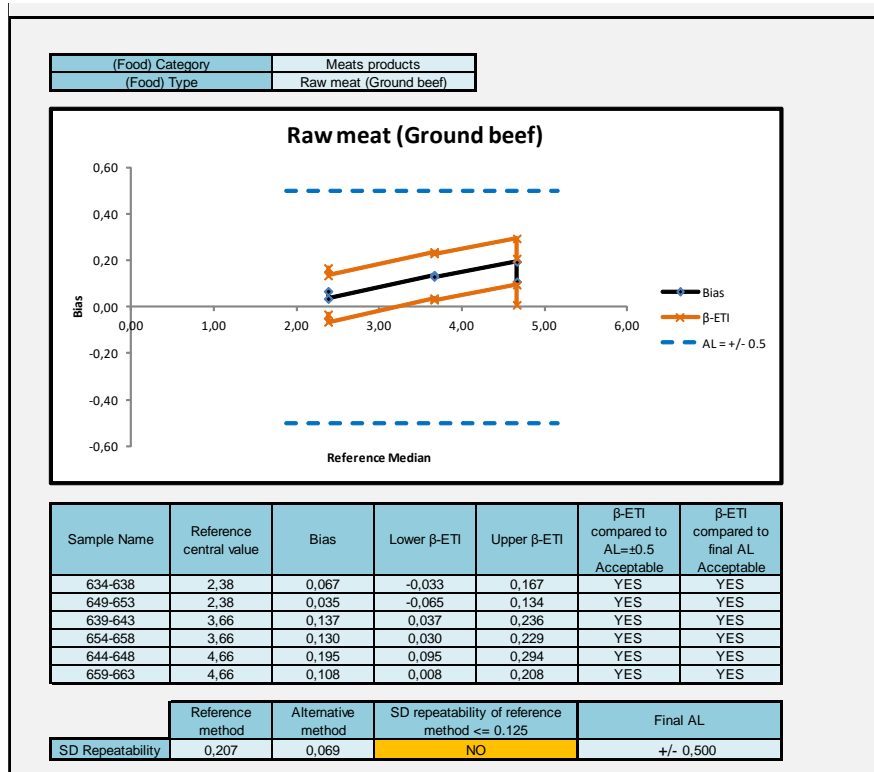
3.1.2.2 Calculation and interpretation

The raw data are provided in **Appendix 4**. The summary tables (in log CFU/g) and calculations are provided in **Appendix 5**. The statistical results and the accuracy profiles are provided Figure 10.

The calculations were done using the AP Calculation Tool MCS (Clause 6-1-3-3 calculation and interpretation of accuracy profile study) ver 2027-01-2015 available on <http://standards.iso.org/iso/16140>.

The accuracy profiles are comprised within the Acceptability Limits for all the tested matrices.

Figure 10 – Accuracy profile



If any of the upper or lower limits exceeds the limits and the standard deviation, additional evaluation procedure has to be followed, as described the ISO 16140-2 (2016): new acceptability limits as a function of the standard deviation $AL_s = 4 \cdot s_{ref}$ are calculated. This was the case for raw fish fillet; the SD repeatability method value was 0.266 and the ALs = ± 1.064 . The lower β .ETI for the intermediate inoculation level for one batch was - 0.643 log.

3.1.2.3 Conclusion

The observed profiles are comprised within the AL. All the accuracy profiles fulfill the performance criteria.

3.1.3 Inclusivity and exclusivity studies

The inclusivity study is a study involving pure target strains to be detected or enumerated by the alternative method. The exclusivity study is a study involving pure non-target strains, which can be potentially cross-reactive, but are not expected to be detected or enumerated by the alternative method.

3.1.3.1 Protocol

Inclusivity

51 strains were tested: 21 in 1997 and 1998, 12 in 2006, and 18 additional strains for the renewal study.

Each test was performed once with the alternative method, the reference method and a non-selective agar (PCA). One ml of the BHI culture was transferred in a LST broth before inoculation in a BLBVB tube. The production of gas was observed.

Exclusivity

30 non-target strains were tested: 16 in 1997, 4 in 2006 and 11 additional strains for the renewal study in 2018.

Each test was performed once with the alternative methods, the reference methods and a non-selective agar. One ml of the BHI culture was inoculated in a LST broth before inoculation in a BLBVB tube. The production of gas was observed.

3.1.3.2 Results

The raw data are provided in **Appendix 6**.

Inclusivity

The results are summarized in Table 8.

Table 8 - Summarized results

Analysis date	Positive by ISO 4831 and 3M Petrifilm CC	Positive by ISO 4831 only	Positive by 3M Petrifilm CC only	Negative by ISO 4831 and 3M Petrifilm CC	Total
1997 and 1998	11	5	4	1	21
2006	8	0	1	3	12
2018	7	5	2	4	18
Total	26	10	7	8	51

26 strains among the 51 strains tested produced gas by both methods; 10 strains produced gas only in BLBVB, 7 strains only in Petrifilm Coliform Count plate and 8 strains did not produce gas with both methods.

It is noticeable that the gas production is not consistent within a species for example:

- On the 3 *Klebsiella pneumoniae* tested, 1 (Ad 1374) produced gas with the 2 methods, 1 (CIP 8291) produced gas on 3M Petrifilm CC plate only and 1 (adria 28) produce gas on BLBVB only.
- On the 5 *Citrobacter freundii* tested: 1 (35) produced gas with the 2 methods, 1 (175) with none of the method, and 3 (CIP 5732, CIP 175 and Ad1326) with tube method only.
- On the 4 *Cronobacter sakazakii* tested: 3 produced gas in BLBVB tubes only (adria 7, 95, AD2413), one (90) produced gas on 3M Petrifilm CC plate only.

The coliforms species are detected by the 2 methods; however, some results are strain dependent.

Exclusivity

31 non-target strains were tested; a summary is given in Table 9.

Table 9 - Summarized results

Analysis date	Gas producing in BLBVB and 3M Petrifilm CC	Gas producing in BLBVB	Gas producing in 3M Petrifilm CC	No gas or no growth producing by both methods	Total
1997	0	2	2	9 + 3 ⁽¹⁾	16
2006	0	0	0	4	4
2018	4	0	0	7	11
Total	4	2	2	24	31

24 strains did not grow or were not able to produce gas in the tested media. 8 strains were able to grow and produce gas with one or both methods.

3.1.3.3 Conclusion

The 3M Petrifilm Coliform Count plate is as specific and selective as the reference method.

3.1.4 Practicability

The criteria described in the AFNOR technical rules were evaluated.

Criteria to be control	Communication on criteria	Expert lab checking procedure
Storage conditions	Store the unopened 3M Petrifilm pouches at frozen or refrigerated temperature less than or equal to 8°C (46°F)	Mentioned on the instruction for use
Shelf-life and modalities of utilization after first use	Store resealed pouches in a cool dry place for no longer than four weeks	Mentioned in the kit insert
Time to result	24 h ± 2 h	Mentioned in the kit insert
Common step with the reference method	/	Initial suspensions and dilutions

The results are available in one day with the alternative method and four days with the reference methods.

¹ For 3 strains, the result in BLBVB is not available.

3.2 Inter-laboratory Study

The aim of the inter-Laboratory study is to determine the variability of the results obtained in different laboratories using identical samples and to compare these results with those obtained in the methods comparison study.

The results of the inter-laboratory studies run in 2006 were interpreted according to the EN ISO 16140-2:2016 standard using the Excel spread sheet ([http://standards.iso.org/iso/16140/-2/ed-1/en/AP%20calculation%20tool_ILS_\(clause_6-2-3_Calculations_summary_and_interpretation_of_data\)_ver%2014-03-2016.xlsx](http://standards.iso.org/iso/16140/-2/ed-1/en/AP%20calculation%20tool_ILS_(clause_6-2-3_Calculations_summary_and_interpretation_of_data)_ver%2014-03-2016.xlsx)).

The data obtained with the ISO 4832 method were taken into account for this inter-laboratory study (approved by the AFNOR Technical Committee in 2006).

3.2.1 Study organization

14 laboratories participated to this study. Detailed instructions were transmitted to the collaborators by the expert laboratory.

Pasteurized semi-skimmed milk was inoculated by *Escherichia coli* 94, isolated from dairy product.

Inoculation levels targeted were:

- 0 CFU/ml,
- 10 – 100 CFU/ml,
- 100 – 1 000 CFU/ml,
- 1 000 – 10 000 CFU/ml.

Each laboratory received eight flasks of 25 ml sample, i.e. two flasks per inoculation level. Furthermore, one non-inoculated sample was added to the package for total viable count microflora (NF ISO 4833 method).

Coded samples (code is only known by the expert laboratory) were placed in isothermal boxes which contained cooling blocks, and express-shipped to the different laboratories.

A temperature control flask containing temperature probe was added to the package in order to record temperature profile during transport and at

reception. Samples were shipped in 24 h to laboratories of the collaborative study. Sample temperature should be lower or equal to 8°C during transport, and between 0°C - 8°C at arrival.

Collaborative study laboratories and the expert laboratory carried out the analyses with the alternative and reference methods.

A stability study of the strain inoculated was run in order to verify there is no evolution during the transport.

3.2.2 *Experimental parameters controls*

3.2.2.1 *Strain stability during transport*

In order to evaluate the *Escherichia coli* 94 strain variability during transport, bacterial count of all inoculated flasks was checked at different time, i.e. inoculation time, after 24 h and 48 h of conservation at 2°C. Results are reported in table 10.

Table 10 – *Escherichia coli* 94 stability in the matrix (in log CFU/ml)

	Level 1		Level 2		Level 3	
	Reference method	Alternative method	Reference method	Alternative method	Reference method	Alternative method
Day 0	73 / 85	55 / 80	720 / 670	450 / 420	6 600 / 6 800	3 500 / 4 900
Day 1	47 / 42	61 / 64	630 / 550	480 / 520	7 000 / 5 700	3 500 / 3 500
Day 2	83 / 91	74 / 68	740 / 610	650 / 810	6 500 / 1 600	4 900 / 6 200

No evolution was observed during storage for 48 h at 5°C ± 3°C.

3.2.2.2 *Logistic conditions*

The temperatures measured at reception by the Labs, the temperatures registered by the thermo-probe, and the receipt dates are given in Table 11.

Table 11 - Sample temperatures at receipt

Laboratories	Temperature measured by the temperature probe (°C)
A	2.2
B	2.0
C	5.3
D	1.7
E	2.7
F	3.3
G	2.8
H	4.9
I	3.5
J	1.5
K	1.8
L	3.9
N	2.5
O	5.0

No problem was encountered during the transport or at receipt for the 14 collaborators. All the samples were delivered on time and in appropriate conditions. Temperatures during shipment and at receipt were all correct.

3.2.3 Result analysis

The raw data are given in **Appendix 7**.

3.2.3.1 Results obtained by the expert Lab.

The results obtained by the expert Lab. are the following (See table 12).

Table 12 – Results obtained by the expert Lab. (log CFU/g)

Level	Targeted rate (log CFU/g)	Reference method		Alternative method	
		Duplicate 1	Duplicate 2	Duplicate 1	Duplicate 2
0	0	0	0	0	0
1	1 to 2	1.67	1.62	1.79	1.81
2	2 to 3	2.80	2.74	2.68	2.72
3	3 to 4	3.85	3.76	3.54	3.54

3.2.3.2 Results obtained by the collaborators

Mesophilic aerobic microflora

The mesophilic aerobic microflora was done on the matrix with ISO 4833 method. The results varied from 70 to 3 600 CFU/ml.

Total coliform enumeration

A summary of the test results is given in Table 13 (CFU/g) and Table 14 (log CFU/g).

Table 13 - Summary of data (CFU/ml)

Labs	Level 0				Level 1				Level 2				Level 3			
	Reference method		Alternative method		Reference method		Alternative method		Reference method		Alternative method		Reference method		Alternative method	
A	0	0	0	0	84	65	60	53	800	600	400	360	9300	5500	5000	3800
B	0	0	0	0	64	63	75	63	690	710	560	650	4600	6500	4200	4700
C	0	0	0	0	38	33	55	57	460	430	540	410	4800	3600	3100	4000
D	0	0	0	0	74	62	85	64	720	690	560	660	5700	6600	3200	3900
E	0	0	0	0	73	84	76	68	620	960	670	650	8700	7700	6900	6200
F	0	0	0	0	66	63	64	76	560	560	550	560	7000	5300	5500	4700
G	0	0	0	0	61	73	77	91	820	750	710	620	7800	9100	6600	6100
H	0	0	0	0	62	73	71	76	690	680	560	560	6500	6700	4200	5100
J	0	0	0	0	56	65	62	44	590	850	490	500	4900	5900	6500	4000
K	0	0	0	0	77	67	76	68	770	750	660	660	5700	5900	5100	5500
L	0	0	0	0	21	33	70	65	380	540	540	600	6400	5900	4800	5300
N	0	0	0	0	76	88	68	87	860	920	680	650	9500	9900	8000	5200
O	0	0	0	0	92	86	77	89	900	880	650	670	7800	6500	5800	5000

Table 14 - Summary of data (log CFU/ml)

Labs	Level 0				Level 1				Level 2				Level 3			
	Reference method		Alternative method		Reference method		Alternative method		Reference method		Alternative method		Reference method		Alternative method	
A	<1	<1	<1	<1	2,362	2,301	2,342	2,204	3,505	3,255	3,362	3,255	4,362	4,342	4,398	4,255
B	<1	<1	<1	<1	2,230	2,279	2,204	2,079	3,255	3,380	3,176	3,204	4,301	4,322	4,041	4,000
C	<1	<1	<1	<1	2,342	2,146	2,176	2,000	3,204	3,279	3,176	3,204	4,398	4,255	4,230	4,301
D	<1	<1	<1	<1	2,342	2,301	2,398	2,301	3,431	3,431	3,279	3,362	4,279	4,362	4,301	4,255
E	<1	<1	<1	<1	2,301	2,230	2,041	2,204	3,146	3,176	3,176	3,079	4,204	3,968	3,886	3,875
F	<1	<1	<1	<1	2,204	2,279	1,903	2,079	3,041	3,146	3,204	3,079	4,431	4,301	4,000	4,041
G	<1	<1	<1	<1	2,146	2,204	2,322	2,176	3,230	3,230	3,176	3,176	4,279	3,991	4,114	4,041
H	<1	<1	<1	<1	2,279	2,230	2,380	2,255	3,255	3,176	3,398	3,230	4,342	4,322	4,380	4,230
I	<1	<1	<1	<1	2,380	2,415	2,322	2,041	3,342	3,301	3,279	3,279	4,204	4,146	4,204	3,940
J	<1	<1	<1	<1	2,204	2,176	2,079	2,204	3,301	3,255	3,301	3,279	4,255	4,114	4,230	4,146
K	<1	<1	<1	<1	2,255	2,279	2,041	2,301	3,301	3,342	3,255	3,279	4,204	4,176	4,255	4,362
L	<1	<1	<1	<1	2,431	2,230	2,301	2,146	3,301	3,255	3,342	3,342	4,204	4,079	4,230	4,176
M	<1	<1	<1	<1	2,301	2,342	2,322	2,114	3,230	3,431	3,342	3,380	4,176	4,204	4,114	4,176
N	<1	<1	<1	<1	2,176	2,204	2,204	2,279	3,230	3,204	3,230	3,146	4,462	4,230	4,301	4,176

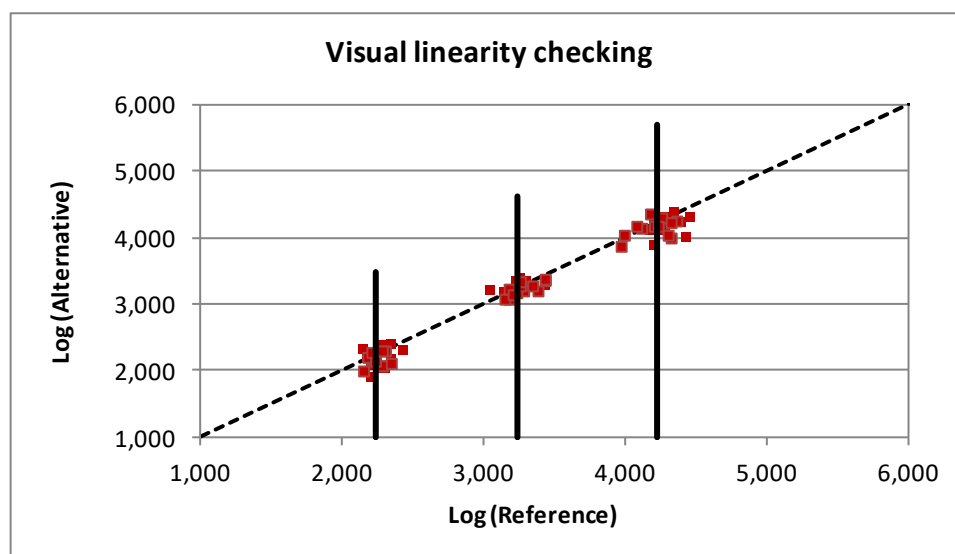
The laboratory A received the package at Day 1, but realized the analyses only at Day 2 and the laboratory I did not realize two successive dilutions. These results were not taken into account for statistical interpretation.

3.2.4 Calculation and interpretation

3.2.4.1 Visual linearity checking

The figure 11 shows the data points after \log_{10} transformation. The visual inspection shows that the alternative method gives results, which are proportional to those of the reference method. The data are distributed closely to the first bisecting lines with a slope equal to 1.

Figure 11 - Visual linearity checking



3.2.4.2 Accuracy profile calculation

Statistical calculations were done according to the Excel spreadsheet available on <http://standards.iso.org/ISO/16140>. A summary of the statistical test is provided in Table 15.

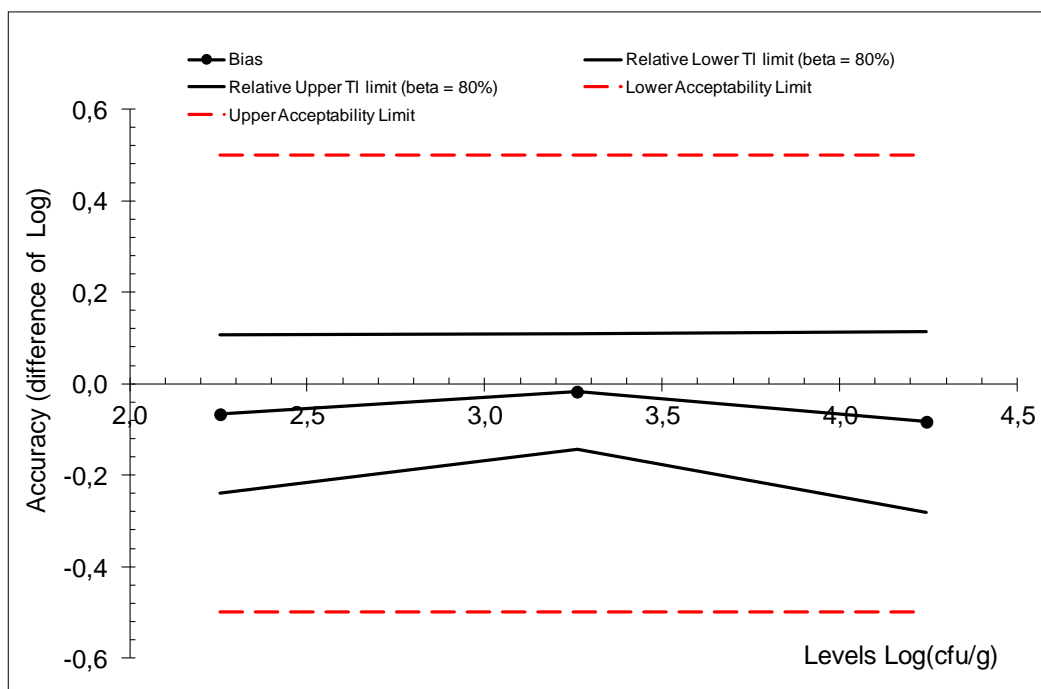
Table 15 - Summary of statistical tests

Accuracy profile				0,5		
Study Name	3M Petrifilm CC					
Date	2006					
Coordinator	ADRIA Développement					
Tolerance probability (beta)	80%	80%	80%			
Acceptability limit in log (lambda)	0,50	0,50	0,50			
	Alternative method			Reference method		
Levels	Low	Medium	High	Low	Medium	High
Target value	2,255	3,260	4,244			
Number of participants (K)	12	12	12	12	12	12
Average for alternative method	2,188	3,242	4,161	2,255	3,260	4,244
Repeatability standard deviation (sr)	0,113	0,054	0,057	0,066	0,060	0,107
Between-labs standard deviation (sL)	0,060	0,073	0,129	0,024	0,077	0,063
Reproducibility standard deviation (sR)	0,128	0,091	0,141	0,070	0,097	0,124
Corrected number of dof	21,531	15,661	12,980	22,403	15,943	21,058
Coverage factor	1,355	1,383	1,401			
Interpolated Student t	1,322	1,338	1,350			
Tolerance interval standard deviation	0,1309	0,0938	0,1464			
Lower TI limit	2,015	3,117	3,963			
Upper TI limit	2,361	3,368	4,359			
Bias	-0,067	-0,017	-0,083			
Relative Lower TI limit (beta = 80%)	-0,240	-0,143	-0,281			
Relative Upper TI limit (beta = 80%)	0,106	0,108	0,114			
Lower Acceptability Limit	-0,50	-0,50	-0,50			
Upper Acceptability Limit	0,50	0,50	0,50			
New acceptability limits may be based on reference method pooled variance						
Pooled repro standard dev of reference	0,100					

Application of clause 6.2.3
 Step 8: If any of the values for the β -ETI fall outside the acceptability limits, calculate the pooled average reproducibility standard deviation of the reference method.
 Step 9: Calculate new acceptability limits as a function of this standard deviation.

These values are collected in a graphical representation together with the acceptability limits (AL). This representation is given Figure 12.

Figure 12 - Accuracy profile



It is observed that for all the levels, the tolerance interval limits of the alternative method are within the acceptability limits of 0.5 log.

The results obtained with the alternative method are not statically different than those obtained with the reference method.

3.2.4.3 Conclusion

The alternative method is equivalent to the reference method.

3.3 General conclusion

The observed data and interpretation confirm the performances of the alternative method:

- 127 samples providing interpretable results by both methods were tested in the relative trueness study, which clearly satisfied the required criteria for quantitative method comparison per ISO 16140-2;
- The observed profiles were comprised within the AL set at ± 0.5 Log CFU/g for 4 matrices and set at ± 1.064 log CFU/g for raw fish fillet.
- The inclusivity and exclusivity testing showed satisfying results.
- The quality assurance parameters were verified (i.e. targeted levels, strain stability, logistic conditions, analyses), confirming that the inter-laboratory study was conducted in appropriate conditions.
- For the inter-laboratory study, the data interpretations were done according to the EN ISO 16140-2:2016. For the three contamination levels, the alternative method was accepted as equivalent to the reference method.

Based on the results obtained for the method comparison study and the inter-laboratory study, the 3M Petrifilm Coliform Count (CC) Plate is considered equivalent to the reference method.

Quimper, 09 June 2022

Maryse RANNOU
Project Manager
Validation of Alternative methods
Food Safety & Quality



I hereby attest to the validation of the verification of the conformity of the report (opinion and interpretation).

Appendix 1 – Artificial contaminations of samples

Analysis date	Sample N°	Product (French name)	Product	Inoculations				Category	Type
				Strain		Injury applied	Injury evaluation		
				Reference	Origin				
2018	1163	Riz au crabe	RTE (crab rice)	<i>E.coli</i> 144	Paëlla	Seeding 48h 5±3°C	/	4	b
2018	1926	Filet de Merlan	Fish fillet	<i>E.cloacae</i> 148	Paëlla	Seeding 48h 5±3°C	/	4	a
2018	1927	Dos de Cabillaud	Fish fillet	<i>E.coli</i> 93	RTRH fish meal	Seeding 48h 5±3°C	/	4	a
2018	1928	Saumon d'élevage	Salmon fillet	<i>E.coli</i> 144	Paëlla	Seeding 48h 5±3°C	/	4	a
2018	1934	Macédoine de légumes	RTE (Macédoine)	<i>C.freundii</i> 53	Green beans	Seeding 48h 5±3°C	/	5	b
2018	2121	Carottes râpées	RTE (Grated carrots)	<i>C.sakazakii</i> 138	Spices	Seeding 48h 5±3°C	/	5	c
2018	2122	Falafels pois chiches	RTRH (falafels)	<i>E.coli</i> Ad1584	River water	Seeding 48h 5±3°C	/	5	c
2018	2123	Couscous végétarien	RTRH (Vegetarian couscous)	<i>E.coli</i> Ad1584	River water	Seeding 48h 5±3°C	/	5	c
2018	2124	Filet de lieu noir	Raw fish fillet	<i>E.coli</i> Ad1403	Sea water	Seeding 48h 5±3°C	/	4	a
2018	2125	Filet de Julienne	Raw fish fillet	<i>E.coli</i> Ad1384	Sea water	Seeding 48h 5±3°C	/	4	a
2018	2245	Filet de merlu	Raw fish fillet	<i>E.coli</i> Ad228	Fish	Seeding 48h 5±3°C	/	4	a
2018	2246	Filet de merlu	Raw fish fillet	<i>E.coli</i> Ad228	Fish	Seeding 48h 5±3°C	/	4	a
2018	2247	Filet de tacaud	Raw fish fillet	<i>K.pneumoniae</i> Ad1374	Surface water	Seeding 48h 5±3°C	/	4	a
2018	2248	Vieille	Fish	<i>K.oxytoca</i> Ad1371	Water	Seeding 48h 5±3°C	/	4	a
2018	2249	Mulet	Fish	<i>E.coli</i> 20	Well water	Seeding 48h 5±3°C	/	4	a
2018	2250	Lait ribot	Fermented milk	<i>E.agglomerans</i> 74	Cheese	Seeding 48h 5±3°C	/	2	b
2018	2251	Lait fermenté	Fermented milk	<i>E.kobei</i> Ad706	Milk powder	Seeding 48h 5±3°C	/	2	b

Appendix 2 - Relative trueness study: raw data

* < 4 colonies per plate

Ne: estimated number

N': arithmetic mean

MEAT PRODUCTS																		Category	Type
Analysis date	Sample N°	Product (french name)	Product	Initial suspension pH	Reference method : ISO 4831*		Alternative method: Test 3M™ Petrifilm™ Coliform Count Plate (24 h)												
					CFU/g	log CFU/g	Dilution	Rep 1	Rep 2	CFU/g Rep 1	CFU/g Rep 2	CFU/g Rep 1	CFU/g Rep 2	Gaz producing colonies					
														log CFU/g (a)	log CFU/g (b)	Rep 1 kept for interpretation log CFU/g			
1997	116	Minerai	Meat beef	/	/	3,63	/	/	/	/	/	/	/	4,04	3,90	4,04	1	a	
1997	135	Steak haché	Ground beef	/	/	5,04	/	/	/	/	/	/	/	5,65	5,67	5,65	1	a	
1997	137	Foie de veau	Veal liver	/	/	3,63	/	/	/	/	/	/	/	4,26	4,16	4,26	1	a	
1997	145	Steak haché	Ground beef	/	/	4,38	/	/	/	/	/	/	/	4,00	4,04	4,00	1	a	
1997	165	Rognon de veau	Veal kidney	/	/	4,63	/	/	/	/	/	/	/	4,58	4,55	4,58	1	a	
1997	166	Langue de porc	Pork tongue	/	/	5,66	/	/	/	/	/	/	/	5,36	5,57	5,36	1	a	
1997	167	Foies de canard	Duck liver	/	/	5,32	/	/	/	/	/	/	/	5,00	5,20	5,00	1	a	
1997	168	Gésiers de canard	Duck gizzards	/	/	5,66	/	/	/	/	/	/	/	4,60	4,30	4,60	1	a	
1997	193	Langue de porc	Pork tongue	/	/	5,97	/	/	/	/	/	/	/	5,60	5,48	5,60	1	a	
1998	40*	VSM dinde	Turkey meat	/	/	3,97	/	/	/	/	/	/	/	2,88	3,00	2,88	1	a	
1998	41*	VSM dinde	Turkey meat	/	/	3,38	/	/	/	/	/	/	/	2,46	2,26	2,46	1	a	
1998	42*	VSM dinde	Turkey meat	/	/	3,63	/	/	/	/	/	/	/	3,49	3,54	3,49	1	a	
1998	30**	Cervelle de porc	Delicatessen	/	/	3,18	/	/	/	/	/	/	/	2,90	2,60	2,90	1	a	
1998	31**	Cœur de porc	Raw pork	/	/	4,63	/	/	/	/	/	/	/	3,85	3,78	3,85	1	a	
1998	32**	Foie de bœuf	Beef liver	/	/	5,18	/	/	/	/	/	/	/	4,08	4,11	4,08	1	a	
1997	136	Escalope viennoise	Schnitzel	/	/	4,58	/	/	/	/	/	/	/	4,71	4,80	4,71	1	b	
1998	101	Bœuf aux carottes	RTRH (beef carrots)	/	/	3,38	/	/	/	/	/	/	/	4,30	4,20	4,30	1	b	
1997	113	Gésiers confits	Gizzards	/	/	3,66	/	/	/	/	/	/	/	3,90	4,04	3,90	1	b	
1997	117	Raviolis	RTRH (raviolis)	/	/	1,63	/	/	/	/	/	/	/	1,70	1,90	1,70	1	b	
1997	138	Chou farci	RTRH (cabbage farce)	/	/	4,97	/	/	/	/	/	/	/	5,04	5,07	5,04	1	b	
1997	139	Bœuf aux carottes	RTRH (beef carrots)	/	/	3,38	/	/	/	/	/	/	/	3,98	3,86	3,98	1	b	
1997	192	Paupiette de veau	RTRH (veal meat)	/	/	4,04	/	/	/	/	/	/	/	3,48	3,61	3,48	1	b	
1998	7*	Pizza chèvre-lardons	RTRH (pizza)	/	/	0,56	/	/	/	/	/	/	/	1,00	1,60	1,00*	1	b	
1998	27*	Feuilleté ris de veau	RTRH (veal)	/	/	1,96	/	/	/	/	/	/	/	4,85	4,90	4,85	1	b	
1998	28*	Feuilleté ris de veau	RTRH (veal)	/	/	5,04	/	/	/	/	/	/	/	4,94	4,93	4,94	1	b	
1998	29*	Croque ouest	RTRH (croque)	/	/	2,97	/	/	/	/	/	/	/	3,44	3,50	3,44	1	b	
1998	31*	Pizza jambon	RTRH (pizza)	/	/	2,18	/	/	/	/	/	/	/	2,90	2,60	2,90	1	b	
1998	49*	Langue de bœuf	Beef tongue	/	/	3,04	/	/	/	/	/	/	/	2,78	3,16	2,78	1	b	
1998	15**	Paupiette de veau	RTRH (veal)	/	/	1,56	/	/	/	/	/	/	/	2,19	2,37	2,19	1	b	
1998	16**	Langue de bœuf	Beef tongue	/	/	3,18	/	/	/	/	/	/	/	3,00	3,00	3,00	1	b	
1998	53**	Intérieur bouchée à la reine	RTRH (chicken)	/	/	3,97	/	/	/	/	/	/	/	4,82	4,76	4,82	1	b	
1998	54**	Croque monsieur	RTRH (croque)	/	/	3,63	/	/	/	/	/	/	/	2,66	2,61	2,66	1	b	
1998	55**	Farce de tomate farcie	Seasoned ground pork	/	/	2,97	/	/	/	/	/	/	/	2,00	2,19	2,00	1	b	
1998	61**	Bouchée à la reine	RTRH (chicken)	/	/	4,97	/	/	/	/	/	/	/	4,34	4,48	4,34	1	b	
1997	121	Chipolatas	Sausage	/	/	5,08	/	/	/	/	/	/	/	4,48	4,48	4,48	1	c	
1997	125	Rillettes	Rillettes	/	/	2,66	/	/	/	/	/	/	/	1,60	1,48	1,60	1	c	

* Analyses performed according to the COFRAC accreditation

ADRIA Développement
Summary report (Version 0)

3M Petrifilm Coliform Count (CC) Plate (B)

MEAT PRODUCTS																		Category	Type
Analysis date	Sample N°	Product (french name)	Product	Initial suspension pH	Reference method : ISO 4831*		Alternative method: Test 3M™ Petrifilm™ Coliform Count Plate (24 h)												
					CFU/g	log CFU/g	Dilution	Rep 1	Rep 2	CFU/g Rep 1	CFU/g Rep 2	CFU/g Rep 1	CFU/g Rep 2	Gaz producing colonies					
														log CFU/g (a)	log CFU/g (b)	Rep 1 kept for interpretation log CFU/g			
1997	129	Poitrine fumée	Bacon	/	/	2,38	/	/	/	/	/	/	/	1,90	1,90	1,90	1	c	
1997	169	Saucisses	Sausages	/	/	4,38	/	/	/	/	/	/	/	4,26	4,44	4,26	1	c	
1997	173	Chair à saucisse	Seasoned ground pork	/	/	4,63	/	/	/	/	/	/	/	4,30	4,30	4,30	1	c	
1997	175	Merguez congelée	Frozen merguez	/	/	4,66	/	/	/	/	/	/	/	2,70	2,60	2,70	1	c	
1998	2*	Jambon blanc	Ham	/	/	3,04	/	/	/	/	/	/	/	3,15	4,04	3,15	1	c	
1998	9*	Mousse de canard	Duck mousse	/	/	2,04	/	/	/	/	/	/	/	4,73	4,64	4,73	1	c	
1998	14*	Rillettes	Rillettes	/	/	1,04	/	/	/	/	/	/	/	1,00	1,00	1,00*	1	c	
1998	58*	Jambon	Ham	/	/	>3,04	/	/	/	/	/	/	/	3,78	3,81	3,78	1	c	
1998	59*	Boudin noir aux pommes	Black pudding with apples	/	/	2,18	/	/	/	/	/	/	/	2,73	2,73	2,73	1	c	
1998	105*	Pâté de campagne	Pâté	/	/	4,38	/	/	/	/	/	/	/	4,61	4,49	4,61	1	c	
1998	106*	Museau	Delicatessen	/	/	4,38	/	/	/	/	/	/	/	4,11	4,24	4,11	1	c	
1998	107*	Rôti cuit	Delicatessen	/	/	4,18	/	/	/	/	/	/	/	3,30	3,37	3,30	1	c	
1998	2**	Chipolatas	Sausage	/	/	2,38	/	/	/	/	/	/	/	2,62	2,70	2,62	1	c	
1998	17**	Pâté fermier	Pâté	/	/	2,18	/	/	/	/	/	/	/	1,78	1,85	1,78	1	c	
1998	42**	Poitrine 1/2 sel	Delicatessen	/	/	3,18	/	/	/	/	/	/	/	3,51	3,49	3,51	1	c	

DAIRY PRODUCTS																		Category	Type
Analysis date	Sample N°	Product (french name)	Product	Initial suspension pH	Reference method : ISO 4831*		Alternative method: Test 3M™ Petrifilm™ Coliform Count Plate (24 h)												
					CFU/g	log CFU/g	Dilution	Rep 1	Rep 2	CFU/g Rep 1	CFU/g Rep 2	CFU/g Rep 1	CFU/g Rep 2	Gaz producing colonies					
														log CFU/g (a)	log CFU/g (b)	Rep 1 kept for interpretation log CFU/g			
1997	119	Lait cru	Raw milk	/	/	1,96	/	/	/	/	/	/	/	4,30	4,18	4,30	2	a	
1997	148	Lait cru	Raw milk	/	/	3,18	/	/	/	/	/	/	/	2,80	2,80	2,80	2	a	
1997	149	Lait cru	Raw milk	/	/	2,88	/	/	/	/	/	/	/	2,11	2,08	2,11	2	a	
1997	150	Lait cru	Raw milk	/	/	3,66	/	/	/	/	/	/	/	3,26	3,28	3,26	2	a	
1997	151	Lait cru	Raw milk	/	/	1,81	/	/	/	/	/	/	/	1,00	1,70	1,00*	2	a	
1997	152	Lait cru	Raw milk	/	/	2,18	/	/	/	/	/	/	/	1,30	1,60	1,30*	2	a	
1997	153	Lait cru	Raw milk	/	/	2,38	/	/	/	/	/	/	/	2,39	2,42	2,39	2	a	
1998	10**	Lait cru fermier	Raw milk	/	/	3,63	/	/	/	/	/	/	/	3,32	3,15	3,32	2	a	
1997	110	Brebis 1/2 sec	Cheese	/	/	3,97	/	/	/	/	/	/	/	3,45	3,59	3,45	2	b	
1997	120	Brie	Cheese	/	/	5,04	/	/	/	/	/	/	/	4,21	4,26	4,21	2	b	
1997	128	Vieux pané	Cheese	/	/	2,88	/	/	/	/	/	/	/	1,60	1,00	1,60	2	b	
1998	93*	Fromage	Cheese	/	/	1,96	/	/	/	/	/	/	/	2,08	2,30	2,08	2	b	
1998	97*	Fromage	Cheese	/	/	1,63	/	/	/	/	/	/	/	1,90	1,78	1,90	2	b	
1998	98*	Fromage	Cheese	/	/	3,63	/	/	/	/	/	/	/	3,28	3,11	3,28	2	b	
1998	6**	Chamois d'or	Cheese	/	/	3,66	/	/	/	/	/	/	/	3,60	3,37	3,60	2	b	
1998	8**	Fol épi	Cheese	/	/	3,18	/	/	/	/	/	/	/	3,19	3,24	3,19	2	b	
1998	35**	Bleu de Causses	Cheese	/	/	3,63	/	/	/	/	/	/	/	3,34	3,39	3,34	2	b	
1998	36**	Epoisses	Cheese	/	/	4,63	/	/	/	/	/	/	/	4,32	4,34	4,32	2	b	
1998	37**	Reblochon	Cheese	/	/	3,97	/	/	/	/	/	/	/	3,54	3,71	3,54	2	b	
1998	43**	Morbier	Cheese	/	/	2,87	/	/	/	/	/	/	/	3,85	4,04	3,85	2	b	
2018	2250	Lait ribot	Fermented milk	/	43	1,63	10	43	/	427	/	430	/	2,63	/	2,63	2	b	
							100	4	/										
2018	2251	Lait fermenté	Fermented milk	/	92	1,96	100	113	/	11364	/	11000	/	4,04	/	4,04	2	b	
							1000	12	/										
1997	118	Chou chantilly	Wiped cream	/	/	4,66	/	/	/	/	/	/	/	4,45	4,26	4,45	2	c	
1997	140	Nougat glacé	Iced nougat	/	/	1,88	/	/	/	/	/	/	/	1,30	1,00	1,30*	2	c	
1997	141	Nougat glacé	Iced nougat	/	/	1,38	/	/	/	/	/	/	/	1,00	1,00	1,00*	2	c	
1997	142	Nougat glacé	Iced nougat	/	/	1,97	/	/	/	/	/	/	/	1,00	1,00	1,00*	2	c	
1997	195	Buche glacée	Ice cream	/	/	3,38	/	/	/	/	/	/	/	2,69	2,56	2,69	2	c	
1998	16*	Buchette à la poire	Ice cream	/	/	2,66	/	/	/	/	/	/	/	1,70	1,95	1,70	2	c	
1998	90*	Buche de Noël	Ice cream	/	/	1,97	/	/	/	/	/	/	/	1,30	1,48	1,30*	2	c	
1998	49**	Crème de forêt noire	Cream	/	/	3,18	/	/	/	/	/	/	/	3,21	3,16	3,21	2	c	
1998	50**	Chantilly (chou)	Chantilly	/	/	2,97	/	/	/	/	/	/	/	2,16	2,28	2,16	2	c	
1998	52**	Chantilly + crème	Chantilly	/	/	2,97	/	/	/	/	/	/	/	2,44	2,46	2,44	2	c	

* Analyses performed according to the COFRAC accreditation

ADRIA Développement
Summary report (Version 0)

3M Petrifilm Coliform Count (CC) Plate (B)

EGG PRODUCTS AND EGG BASED PRODUCTS AND PASTRIES																		Category	Type
Analysis date	Sample N°	Product (french name)	Product	Initial suspension pH	Reference method : ISO 4831*		Alternative method: Test 3M™ Petrifilm™ Coliform Count Plate (24 h)												
					CFU/g	log CFU/g	Dilution	Rep 1	Rep 2	CFU/g Rep 1	CFU/g Rep 2	CFU/g Rep 1	CFU/g Rep 2	Gaz producing colonies					
														log CFU/g (a)	log CFU/g (b)	Rep 1 kept for interpretation log CFU/g			
1997	104	Mayonnaise	Mayonnaise	/	/	3,04	/	/	/	/	/	/	/	2,00	2,30	2,00	3	a	
1997	112	Coule d'œuf	Liquid egg	/	/	4,18	/	/	/	/	/	/	/	4,15	4,15	4,15	3	a	
1997	196	Coule d'œuf	Liquid egg	/	/	5,97	/	/	/	/	/	/	/	5,28	5,39	5,28	3	a	
1997	197	Coule d'œuf	Liquid egg	/	/	5,66	/	/	/	/	/	/	/	5,50	5,48	5,50	3	a	
1997	198	Coule d'œuf	Liquid egg	/	/	5,38	/	/	/	/	/	/	/	5,39	5,24	5,39	3	a	
1997	178	Religieuse	Pastry	/	/	3,66	/	/	/	/	/	/	/	3,04	2,78	3,04	3	b	
1997	179	Eclair chocolat	Pastry	/	/	2,66	/	/	/	/	/	/	/	2,86	2,75	2,86	3	b	
1997	180	Religieuse	Pastry	/	/	3,66	/	/	/	/	/	/	/	3,92	3,95	3,92	3	b	
1998	24*	Religieuse café	Pastry	/	/	0,46	/	/	/	/	/	/	/	1,00	1,48	1,00*	3	b	
1998	46*	Eclair au chocolat	Pastry	/	/	3,18	/	/	/	/	/	/	/	3,26	3,21	3,26	3	b	
1997	177	Mousse au chocolat	Chocolate mousse	/	/	3,66	/	/	/	/	/	/	/	3,62	3,45	3,62	3	c	
1997	188	Crème aux oeufs	Pastry	/	/	2,38	/	/	/	/	/	/	/	2,08	2,04	2,08	3	c	
1997	199	Ile flottante	Egg based product	/	/	5,97	/	/	/	/	/	/	/	6,16	5,30	6,16	3	c	
1997	200	Crème aux oeufs	Pastry	/	/	5,18	/	/	/	/	/	/	/	5,04	5,04	5,04	3	c	
1998	11**	Crème pâtissière	Custard	/	/	3,63	/	/	/	/	/	/	/	3,32	3,32	3,32	3	c	
1998	12**	Crème pâtissière	Custard	/	/	3,38	/	/	/	/	/	/	/	3,15	3,23	3,15	3	c	
1998	14**	Crème pâtissière	Custard	/	/	3,97	/	/	/	/	/	/	/	3,32	3,46	3,32	3	c	
1998	51**	Crème moka	Cream	/	/	1,56	/	/	/	/	/	/	/	1,00	1,48	1,00*	3	c	

* Analyses performed according to the COFRAC accreditation

SEAFOOD PRODUCTS																		Category	Type
Analysis date	Sample N°	Product (french name)	Product	Initial suspension pH	Reference method : ISO 4831*		Alternative method: Test 3M™ Petrifilm™ Coliform Count Plate (24 h)												
					CFU/g	log CFU/g	Dilution	Rep 1	Rep 2	CFU/g Rep 1	CFU/g Rep 2	CFU/g Rep 1	CFU/g Rep 2	Gaz producing colonies					
														log CFU/g (a)	log CFU/g (b)	Rep 1 kept for interpretation log CFU/g			
1997	100	Gambas au curry	RTRH (fish)	/	/	0,95	/	/	/	/	/	/	/	1,00	1,00	1,00	4	c	
1997	147	Poisson en sauce	RTRH (fish)	/	/	4,04	/	/	/	/	/	/	/	3,48	3,60	3,48	4	c	
1997	194	Filet de merlan en sauce	RTRH (fish)	/	/	5,66	/	/	/	/	/	/	/	4,71	4,71	4,71	4	c	
1998	63**	Macédoine de crabe	RTE (macédoine)	/	/	3,97	/	/	/	/	/	/	/	3,68	3,74	3,68	4	b	
1998	72**	Coquille Saint Jacques	RTRH (Saint Jacques)	/	/	1,97	/	/	/	/	/	/	/	2,08	2,32	2,08	4	c	
1998	76**	Salade de thon	RTE (tuna salad)	/	/	3,04	/	/	/	/	/	/	/	2,70	2,90	2,70	4	b	
1998	78**	Poisson blanc en sauce	RTRH (fish)	/	/	1,97	/	/	/	/	/	/	/	1,48	1,30	1,48	4	c	
1997	105	Saumon fumé	Smoked salmon	/	/	5,66	/	/	/	/	/	/	/	5,19	5,45	5,19	4	b	
1997	144	Saumon fumé	Smoked salmon	/	/	5,04	/	/	/	/	/	/	/	5,34	5,39	5,34	4	b	
1997	186	Filet de truite	Trout fillet	/	/	3,38	/	/	/	/	/	/	/	2,90	2,78	2,90	4	a	
1998	36*	Cocktail de fruits de mer	Seafood cocktail	/	/	1,18	/	/	/	/	/	/	/	1,30	1,30	1,30*	4	a	
2018	1163	Riz au crabe	RTE (crab rice)	6,9	460	2,66	10	25	/	264	/	260	/	2,41	/	2,41	4	b	
							100	4	/										
2018	1164	Filet de Tacaud	Raw fish fillet	7,09	20	1,30	10	0	/	<10	/	<10	/	<1,00	/	<1,00	4	a	
							100	0	/										
2018	1165	Filet de Merlan	Raw fish fillet	7,07	<3,1	<0,49	10	0	/	<10	/	<10	/	<1,00	/	<1,00	4	a	
							100	0	/										
2018	1166	Daurade grise	Raw fish fillet	7,09	7,4	0,87	10	0	/	<10	/	<10	/	<1,00	/	<1,00	4	a	
							100	0	/										
2018	1926	Filet de Merlan	Fish fillet	7,08	150	2,18	100	3	/	300	/	300	/	2,48*	/	2,48*	4	a	
							1000	0	/										
2018	1927	Dos de Cabillaud	Fish fillet	7,04	<31	<1,49	1000	0	/	<1000	/	<1000	/	<3,00	/	<3,00	4	a	
							10000	0	/										
2018	1928	Saumon d'élevage	Salmon fillet	7,05	>1100	>3,04	1000	31	/	28182	/	28000	/	4,45	/	4,45	4	a	
							10000	0	/										
2018	2124	Filet de lieu noir	Raw fish fillet	7,04	150	2,18	1000	0	/	<1000	/	<1000	/	<3,00	/	<3,00	4	a	
							10000	0	/										
2018	2125	Filet de Julienne	Raw fish fillet	7,05	<3,1	<0,49	100	0	/	<100	/	<100	/	<2,00	/	<2,00	4	a	
							1000	0	/										
2018	2245	Filet de merlu	Raw fish fillet	7,07	240	2,38	100	11	/	1091	/	1100	/	3,04	/	3,04	4	a	
							1000	1	/										
2018	2246	Filet de merlu	Raw fish fillet	7,06	460	2,66	100	36	/	3545	/	3500	/	3,54	/	3,54	4	a	
							1000	3	/										
2018	2247	Filet de tacaud	Raw fish fillet	7,05	1100	3,04	100	109	/	10091	/	10000	/	4,00	/	4,00	4	a	
							1000	2	/										
2018	2248	Vieille	Fish	7,08	2400	3,38	100	107	/	10818	/	11000	/	4,04	/	4,04	4	a	
							1000	12	/										
2018	2249	Mulet	Fish	7,05	110000	5,04	10000	84	/	854545	/	850000	/	5,93	/	5,93	4	a	
							100000	10	/										

* Analyses performed according to the COFRAC accreditation

VEGETABLES																		Category	Type
Analysis date	Sample N°	Product (french name)	Product	Initial suspension pH	Reference method : ISO 4831*		Alternative method: Test 3M™ Petrifilm™ Coliform Count Plate (24 h)												
					CFU/g	log CFU/g	Dilution	Rep 1	Rep 2	CFU/g Rep 1	CFU/g Rep 2	CFU/g Rep 1	CFU/g Rep 2	Gaz producing colonies					
														log CFU/g (a)	log CFU/g (b)	Rep 1 kept for interpretation log CFU/g g			
1998	43*	Farce aux marrons	RTRH (shestnuts and pork)	/	/	5,04	/	/	/	/	/	/	/	5,04	5,00	5,04	5	c	
1998	62**	Macédoine de légumes	RTE (macédoine)	/	/	4,38	/	/	/	/	/	/	/	4,28	4,26	4,28	5	b	
1997	102	Salade Primavera	RTE (salad)	/	/	3,38	/	/	/	/	/	/	/	3,89	3,76	3,89	5	b	
1997	146	Salade de riz, tomate, maïs	RTE (salad)	/	/	6,04	/	/	/	/	/	/	/	5,52	5,52	5,52	5	b	
1997	156	Chou fleur surgelé	Frozen cauliflower	/	/	1,88	/	/	/	/	/	/	/	3,02	3,03	3,02	5	a	
1997	157	Chou fleur surgelé	Frozen cauliflower	/	/	1,97	/	/	/	/	/	/	/	3,26	3,36	3,26	5	a	
1997	158	Chou fleur surgelé	Frozen cauliflower	/	/	2,66	/	/	/	/	/	/	/	2,50	2,83	2,50	5	a	
1997	159	Carottes surgelées	Frozen cauliflower	/	/	3,38	/	/	/	/	/	/	/	3,32	3,21	3,32	5	a	
1997	160	Tomates surgelées	Frozen cauliflower	/	/	1,97	/	/	/	/	/	/	/	2,16	2,26	2,16	5	a	
1997	161	Tomates surgelées	Frozen cauliflower	/	/	2,32	/	/	/	/	/	/	/	2,58	2,58	2,58	5	a	
1997	162	Pommes de terre surgelées	Frozen potatoes	/	/	1,97	/	/	/	/	/	/	/	1,70	1,60	1,70	5	a	
1997	185	Salade niçoise	RTE (salad)	/	/	2,66	/	/	/	/	/	/	/	1,90	1,85	1,90	5	b	
1998	75*	Petits pois	Peas	/	/	1,88	/	/	/	/	/	/	/	1,00	1,00	1,00*	5	a	
1998	77*	Macédoine	RTE (macédoine)	/	/	0,63	/	/	/	/	/	/	/	1,60	1,48	1,60	5	b	
1998	109*	Haricots plats	Beans	/	/	2,32	/	/	/	/	/	/	/	1,85	2,04	1,85	5	a	
1998	111*	Epinards en branches	Spinach	/	/	3,63	/	/	/	/	/	/	/	2,95	2,93	2,95	5	a	
1998	44**	Sauté de légumes	RTC (turkey vegetables)	/	/	4,63	/	/	/	/	/	/	/	4,76	4,67	4,76	5	c	
1997	21*	Lapacho	Vegetables	/	/	1,18	/	/	/	/	/	/	/	2,64	2,65	2,64	5	c	
1998	58**	Raz el Hanout	Spices	/	/	4,38	/	/	/	/	/	/	/	4,61	4,49	4,61	5	c	
2018	1719	Epinards hachés crème	Spinach with cream	7,05	21	1,32	10	0	/	<10	/	<10	/	<1,00	/	<1,00	5	c	
							100	0	/										
2018	1934	Macédoine de légumes	RTE (Macédoine)	6,97	<3,1	<0,49	100	0	/	<100	/	<100	/	<2,00	/	<2,00	5	b	
							1000	0	/										
2018	2121	Carottes râpées	RTE (Grated carrots)	6,83	<3,1	<0,49	1000	20	/	20909	/	21000	/	4,32	/	4,32	5	c	
							10000	3	/										
2018	2122	Falafels pois chiches	RTRH (falafels)	6,95	>11000	>4,04	1000	67	/	63636	/	64000	/	4,81	/	4,81	5	c	
							10000	3	/										
2018	2123	Couscous végétarien	RTRH (Vegetarian couscous)	7,01	1100	3,04	10	86	/	845	/	850	/	2,93	/	2,93	5	c	
							100	7	/										

♦ Analyses performed according to the COFRAC accreditation

Appendix 3 - Relative trueness study: calculations

Category	Type	N°sample	Log cfu/g		Average	Difference	Alternative method		Average <4 CFU/plate	Difference <4 CFU/plate	Average corrected values	Difference Corrected values
			ISO 4831	3M Petrifilm CC Gas			<4 CFU/plate	<or> threshold corrected values				
1	a	116	3,63	4,04	3,84	0,41			#N/A		#N/A	
	a	135	5,04	5,65	5,35	0,61			#N/A		#N/A	
	a	137	3,63	4,26	3,95	0,63			#N/A		#N/A	
	a	145	4,38	4,00	4,19	-0,38			#N/A		#N/A	
	a	165	4,63	4,58	4,61	-0,05			#N/A		#N/A	
	a	166	5,66	5,36	5,51	-0,30			#N/A		#N/A	
	a	167	5,32	5,00	5,16	-0,32			#N/A		#N/A	
	a	168	5,66	4,60	5,13	-1,06			#N/A		#N/A	
	a	193	5,97	5,60	5,79	-0,37			#N/A		#N/A	
	a	40*	3,97	2,88	3,43	-1,09			#N/A		#N/A	
	a	41*	3,38	2,46	2,92	-0,92			#N/A		#N/A	
	a	42*	3,63	3,49	3,56	-0,14			#N/A		#N/A	
	a	30**	3,18	2,90	3,04	-0,28			#N/A		#N/A	
	a	31**	4,63	3,85	4,24	-0,78			#N/A		#N/A	
	a	32**	5,18	4,08	4,63	-1,10			#N/A		#N/A	
	b	136	4,58	4,71	4,65	0,13			#N/A		#N/A	
	b	101	3,38	4,30	3,84	0,92			#N/A		#N/A	
	b	113	3,66	3,90	3,78	0,24			#N/A		#N/A	
	b	117	1,63	1,70	1,67	0,07			#N/A		#N/A	
	b	138	4,97	5,04	5,01	0,07			#N/A		#N/A	
	b	139	3,38	3,98	3,68	0,60			#N/A		#N/A	
	b	192	4,04	3,48	3,76	-0,56			#N/A		#N/A	
	b	7*	0,56		0,78	0,44	1,00		0,78	0,44	#N/A	
	b	27*	1,96	4,85	3,41	2,89			#N/A		#N/A	
	b	28*	5,04	4,94	4,99	-0,10			#N/A		#N/A	
	b	29*	2,97	3,44	3,21	0,47			#N/A		#N/A	
	b	31*	2,18	2,90	2,54	0,72			#N/A		#N/A	
	b	49*	3,04	2,78	2,91	-0,26			#N/A		#N/A	
	b	15**	1,56	2,19	1,88	0,63			#N/A		#N/A	
	b	16**	3,18	3,00	3,09	-0,18			#N/A		#N/A	
	b	53**	3,97	4,82	4,40	0,85			#N/A		#N/A	
	b	54**	3,63	2,66	3,15	-0,97			#N/A		#N/A	
	b	55**	2,97	2,00	2,49	-0,97			#N/A		#N/A	
	b	61**	4,97	4,34	4,66	-0,63			#N/A		#N/A	
	c	121	5,08	4,48	4,78	-0,60			#N/A		#N/A	
	c	125	2,66	1,60	2,13	-1,06			#N/A		#N/A	
	c	129	2,38	1,90	2,14	-0,48			#N/A		#N/A	
	c	169	4,38	4,26	4,32	-0,12			#N/A		#N/A	
	c	173	4,63	4,30	4,47	-0,33			#N/A		#N/A	
	c	175	4,66	2,70	3,68	-1,96			#N/A		#N/A	
	c	2*	3,04	3,15	3,10	0,11			#N/A		#N/A	
	c	9*	2,04	4,73	3,39	2,69			#N/A		#N/A	
	c	14*	1,04		#N/A		1,00		1,02	-0,04	#N/A	
	c	58*	4,04		#N/A			3,78	#N/A		3,91	-0,26
	c	59*	2,18	2,73	2,46	0,55			#N/A		#N/A	
	c	105*	4,38	4,61	4,50	0,23			#N/A		#N/A	
	c	106*	4,38	4,11	4,25	-0,27			#N/A		#N/A	
	c	107*	4,18	3,30	3,74	-0,88			#N/A		#N/A	
	c	2**	2,38	2,62	2,50	0,24			#N/A		#N/A	
	c	17**	2,18	1,78	1,98	-0,40			#N/A		#N/A	
	c	42**	3,18	3,51	3,35	0,33			#N/A		#N/A	
Average category 1						-0,06						
Standard deviation of differences category 1						0,86						

Category	Type	N°sample	Log cfu/g		Average	Difference	Alternative method		Average <4 CFU/plate	Difference <4 CFU/plate	Average corrected values	Difference Corrected values
			ISO 4831	3M Petrifilm CC Gas			<4 CFU/plate	<or> threshold corrected values				
2	a	119	1,96	4,30	3,13	2,34			#N/A		#N/A	
	a	148	3,18	2,80	2,99	-0,38			#N/A		#N/A	
	a	149	2,88	2,11	2,50	-0,77			#N/A		#N/A	
	a	150	3,66	3,26	3,46	-0,40			#N/A		#N/A	
	a	151	1,81		#N/A		1,00		1,41	-0,81	#N/A	
	a	152	2,18		#N/A		1,30		1,74	-0,88	#N/A	
	a	153	2,38	2,39	2,39	0,01			#N/A		#N/A	
	a	10**	3,63	3,32	3,48	-0,31			#N/A		#N/A	
	b	110	3,97	3,45	3,71	-0,52			#N/A		#N/A	
	b	120	5,04	4,21	4,63	-0,83			#N/A		#N/A	
	b	128	2,88	1,60	2,24	-1,28			#N/A		#N/A	
	b	93*	1,96	2,08	2,02	0,12			#N/A		#N/A	
	b	97*	1,63	1,90	1,77	0,27			#N/A		#N/A	
	b	98*	3,63	3,28	3,46	-0,35			#N/A		#N/A	
	b	6**	3,66	3,60	3,63	-0,06			#N/A		#N/A	
	b	8**	3,18	3,19	3,19	0,01			#N/A		#N/A	
	b	35**	3,63	3,34	3,49	-0,29			#N/A		#N/A	
	b	36**	4,63	4,32	4,48	-0,31			#N/A		#N/A	
	b	37**	3,97	3,54	3,76	-0,43			#N/A		#N/A	
	b	43**	2,87	3,85	3,36	0,98			#N/A		#N/A	
	b	2250	1,63	2,63	2,13	1,00			#N/A		#N/A	
	b	2251	1,96	4,04	3,00	2,08			#N/A		#N/A	
	c	118	4,66	4,45	4,56	-0,21			#N/A		#N/A	
	c	140	1,88		#N/A		1,30		1,59	-0,58	#N/A	
	c	141	1,38		#N/A		1,00		1,19	-0,38	#N/A	
	c	142	1,97		#N/A		1,00		1,49	-0,97	#N/A	
	c	195	3,38	2,69	3,04	-0,69			#N/A		#N/A	
	c	16*	2,66	1,70	2,18	-0,96			#N/A		#N/A	
c	90*	1,97		#N/A		1,30		1,64	-0,67	#N/A		
c	49**	3,18	3,21	3,20	0,03			#N/A		#N/A		
c	50**	2,97	2,16	2,57	-0,81			#N/A		#N/A		
c	52**	2,97	2,44	2,71	-0,53			#N/A		#N/A		
Average category 2						-0,17						
Standard deviation of differences category 2						0,82						
3	a	104	3,04	2,00	2,52	-1,04			#N/A		#N/A	
	a	112	4,18	4,15	4,17	-0,03			#N/A		#N/A	
	a	196	5,97	5,28	5,63	-0,69			#N/A		#N/A	
	a	197	5,66	5,50	5,58	-0,16			#N/A		#N/A	
	a	198	5,38	5,39	5,39	0,01			#N/A		#N/A	
	b	178	3,66	3,04	3,35	-0,62			#N/A		#N/A	
	b	179	2,66	2,86	2,76	0,20			#N/A		#N/A	
	b	180	3,66	3,92	3,79	0,26			#N/A		#N/A	
	b	24*	0,46	1,00	0,73	0,54			#N/A		#N/A	
	b	46*	3,18	3,26	3,22	0,08			#N/A		#N/A	
	c	177	3,66	3,62	3,64	-0,04			#N/A		#N/A	
	c	188	2,38	2,08	2,23	-0,30			#N/A		#N/A	
	c	199	5,97	6,16	6,07	0,19			#N/A		#N/A	
	c	200	5,18	5,04	5,11	-0,14			#N/A		#N/A	
	c	11**	3,63	3,32	3,48	-0,31			#N/A		#N/A	
	c	12**	3,38	3,15	3,27	-0,23			#N/A		#N/A	
	c	14**	3,97	3,32	3,65	-0,65			#N/A		#N/A	
c	51**	1,56		#N/A		1,00		1,28	-0,56	#N/A		
Average category 3						-0,17						
Standard deviation of differences category 3						0,40						

Category	Type	N°sample	Log cfu/g		Average	Difference	Alternative method		Average <4 CFU/plate	Difference <4 CFU/plate	Average corrected values	Difference Corrected values
			ISO 4831	3M Petrifilm CC Gas			<4 CFU/plate	<or> threshold corrected values				
4	a	186	3,38	2,90	3,14	-0,48			#N/A		#N/A	
	a	36*	1,18		#N/A		1,30		1,24	0,12	#N/A	
	a	1164	1,30		#N/A			0,00	#N/A		0,65	-1,30
	a	1165	0,00		#N/A			0,00	#N/A		0,00	0,00
	a	1166	0,87		#N/A			0,00	#N/A		0,44	-0,87
	a	1926	2,18	2,60	2,39	0,42			#N/A		#N/A	
	a	1927	0,49		#N/A			2,00	#N/A		1,25	1,51
	a	1928	4,04		#N/A			4,45	#N/A		4,24	0,41
	a	2124	2,18		#N/A			2,00	#N/A		2,09	-0,18
	a	2125	0,00		#N/A			1,00	#N/A		0,50	1,00
	a	2245	2,38	3,04	2,71	0,66			#N/A		#N/A	
	a	2246	2,66	3,54	3,10	0,88			#N/A		#N/A	
	a	2247	3,04	4,00	3,52	0,96			#N/A		#N/A	
	a	2248	3,38	4,04	3,71	0,66			#N/A		#N/A	
	a	2249	5,04	5,93	5,49	0,89			#N/A		#N/A	
	b	63**	3,97	3,68	3,83	-0,29			#N/A		#N/A	
	b	76**	3,04	2,70	2,87	-0,34			#N/A		#N/A	
	b	105	5,66	5,19	5,43	-0,47			#N/A		#N/A	
	b	144	5,04	5,34	5,19	0,30			#N/A		#N/A	
	b	1163	2,66	2,41	2,54	-0,25			#N/A		#N/A	
	c	100	0,95	1,00	0,98	0,05			#N/A		#N/A	
	c	147	4,04	3,48	3,76	-0,56			#N/A		#N/A	
	c	194	5,66	4,71	5,19	-0,95			#N/A		#N/A	
	c	72**	1,97	2,08	2,03	0,11			#N/A		#N/A	
c	78**	1,97	1,48	1,73	-0,49			#N/A		#N/A		
Average category 4												0,04
Standard deviation of differences category 4												0,61
5	a	156	1,88	3,02	2,45	1,14			#N/A		#N/A	
	a	157	1,97	3,26	2,62	1,29			#N/A		#N/A	
	a	158	2,66	2,50	2,58	-0,16			#N/A		#N/A	
	a	159	3,38	3,32	3,35	-0,06			#N/A		#N/A	
	a	160	1,97	2,16	2,07	0,19			#N/A		#N/A	
	a	161	2,32	2,58	2,45	0,26			#N/A		#N/A	
	a	162	1,97	1,70	1,84	-0,27			#N/A		#N/A	
	a	75*	1,88		#N/A		1,00		1,44	-0,88	#N/A	
	a	109*	2,32	1,85	2,09	-0,47			#N/A		#N/A	
	a	111*	3,63	2,95	3,29	-0,68			#N/A		#N/A	
	b	62**	4,38	4,28	4,33	-0,10			#N/A		#N/A	
	b	102	3,38	3,89	3,64	0,51			#N/A		#N/A	
	b	146	6,04	5,52	5,78	-0,52			#N/A		#N/A	
	b	185	2,66	1,90	2,28	-0,76			#N/A		#N/A	
	b	77*	0,63	1,60	1,12	0,97			#N/A		#N/A	
	b	1934	0,00		#N/A			1,00	#N/A		0,50	1,00
	c	43*	5,04	5,04	5,04	0,00			#N/A		#N/A	
	c	44**	4,63	4,76	4,70	0,13			#N/A		#N/A	
	c	21*	1,18	2,64	1,91	1,46			#N/A		#N/A	
	c	58**	4,38	4,61	4,50	0,23			#N/A		#N/A	
c	1719	1,32		#N/A			0,00	#N/A		0,66	-1,32	
c	2121	0,00		#N/A			4,32	#N/A		2,16	4,32	
c	2122	5,04		#N/A			4,81	#N/A		4,92	-0,23	
c	2123	3,04	2,93	2,99	-0,11			#N/A		#N/A		
Average category 5												0,16
Standard deviation of differences category 5												0,65
Average all categories				Dall								-0,05
Standard deviation of differences all categories				SDAll								0,74

n all 130
 $\beta=95\%$ $T(0,05;70)=$ 1,978970576
 1,478402487 Upper limit Lower limit Linear
 Average (minimal value) 0,00 1,43 -1,53 -0,05
 Average (maximal value) 10,00 1,43 -1,53 -0,05

Category	n	T(0,05;70)=	SD	ISO formula	Bias	Lower limit (95%)	Upper limit (95%)
1	48	2,01	0,86	1,74	-0,06	-1,80	1,68
2	26	2,06	0,82	1,73	-0,17	-1,90	1,56
3	17	2,12	0,40	0,88	-0,17	-1,05	0,70
4	17	2,12	0,60	1,31	0,07	-1,24	1,37
5	19	2,10	0,65	1,40	0,16	-1,24	1,56
All categories	127	1,98	0,74	1,48	-0,05	-1,53	1,43

Appendix 4 - Accuracy profile study: raw data

Matrix	Strain	Level	N°sample	ISO 4831*		3M Petrifilm CC -Gas producing			
				cfu/g	log cfu/g	Dilution	cfu/plate	cfu/g	log cfu/g
Ground beef Batch 2 Aerobic mesophilic flora: 1,1 10 ⁴ CFU/g	<i>Enterobacter cloacae</i> 128	1	634	240	2,38	10	36	330	2,52
						100	0		
			635	240	2,38	10	23	250	2,40
						100	4		
			636	460	2,66	10	28	280	2,45
					100	3			
		637	460	2,66	10	20	220	2,34	
					100	4			
		638	240	2,38	10	32	330	2,52	
					100	4			
		2	639	11000	4,04	100	64	6500	3,81
						1000	7		
			640	4600	3,66	100	60	6300	3,80
						1000	9		
			641	2400	3,38	100	59	6200	3,79
					1000	9			
		642	4600	3,66	100	76	7100	3,85	
					1000	2			
		643	4600	3,66	100	60	6200	3,79	
					1000	8			
		3	644	24000	4,38	1000	58	59000	4,77
				10000	7				
645	110000		5,04	1000	77	75000	4,88		
				10000	5				
646	110000		5,04	1000	64	64000	4,81		
			10000	6					
647	46000	4,66	1000	70	72000	4,86			
			10000	9					
648	46000	4,66	1000	76	74000	4,87			
			10000	5					
Ground beef Batch 2 Aerobic mesophilic flora: 3,4 10 ³ CFU/g	<i>Enterobacter cloacae</i> 128	1	649	240	2,38	10	23	240	2,38
						100	3		
			650	460	2,66	10	24	260	2,41
						100	5		
			651	240	2,38	10	28	270	2,43
					100	2			
		652	240	2,38	10	18	180	2,26	
					100	2			
		653	460	2,66	10	35	320	2,51	
					100	0			
		2	654	4600	3,66	100	62	6200	3,79
						1000	6		
			655	4600	3,66	100	62	6200	3,79
						1000	6		
			656	4600	3,66	100	64	6500	3,81
					1000	8			
		657	4600	3,66	100	78	7400	3,87	
					1000	3			
		658	4600	3,66	100	55	5700	3,76	
					1000	8			
		3	659	46000	4,66	1000	67	68000	4,83
				10000	8				
660	24000		4,38	1000	40	42000	4,62		
				10000	6				
661	24000		4,38	1000	59	59000	4,77		
			10000	6					
662	46000	4,66	1000	52	53000	4,72			
			10000	6					
663	110000	5,04	1000	74	74000	4,87			
			10000	7					

* Analyses performed according to the COFRAC accreditation

Matrix	Strain	Level	N°sample	ISO 4831*		3M Petrifilm CC -Gas producing			
				cfu/g	log cfu/g	Dilution	cfu/plate	cfu/g	log cfu/g
Pasteurized whole milk Batch 1 Aerobic mesophilic flora: 20 CFU/g	<i>Cronobacter sakazakii</i> Ad1418	1	833	240	2,38	10	19	210	2,32
						100	4		
			834	460	2,66	10	33	310	2,49
						100	1		
			835	460	2,66	10	12	150	2,18
						100	4		
		2	836	240	2,38	10	22	250	2,40
						100	5		
			837	240	2,38	10	30	270	2,43
						100	0		
			838	9300	3,97	100	84	8600	3,93
						1000	11		
		3	839	9300	3,97	100	82	8200	3,91
						1000	8		
			840	9300	3,97	100	87	8900	3,95
						1000	11		
			841	2300	3,36	100	86	9000	3,95
						1000	13		
		1	842	24000	4,38	100	68	6900	3,84
						1000	8		
			843	93000	4,97	1000	74	78000	4,89
						10000	12		
			844	43000	4,63	1000	70	71000	4,85
						10000	8		
2	845	43000	4,63	1000	77	78000	4,89		
				10000	9				
	846	43000	4,63	1000	90	89000	4,95		
				10000	8				
	847	93000	4,97	1000	71	73000	4,86		
				10000	9				
Pasteurized whole milk Batch 2 Aerobic mesophilic flora: <10 CFU/g	<i>Cronobacter sakazakii</i> Ad1418	1	848	93	1,97	10	17	170	2,23
						100	2		
			849	460	2,66	10	19	180	2,26
						100	1		
			850	1100	3,04	10	25	260	2,41
						100	4		
		2	851	93	1,97	10	22	210	2,32
						100	1		
			852	240	2,38	10	19	190	2,28
						100	2		
			853	9300	3,97	100	68	6500	3,81
						1000	4		
		3	854	9300	3,97	100	51	5300	3,72
						1000	7		
			855	2300	3,36	100	50	5300	3,72
						1000	8		
			856	2300	3,36	100	39	3600	3,56
						1000	1		
1	857	9300	3,97	100	67	6900	3,84		
				1000	9				
	858	43000	4,63	1000	61	64000	4,81		
				10000	9				
	859	93000	4,97	1000	55	55000	4,74		
				10000	5				
2	860	75000	4,88	1000	47	45000	4,65		
				10000	3				
	861	43000	4,63	1000	48	46000	4,66		
				10000	3				
	862	23000	4,36	1000	60	60000	4,78		
				10000	6				

* Analyses performed according to the COFRAC accreditation

Matrix	Strain	Level	N°sample	ISO 4831♦		3M Petrifilm CC -Gas producing					
				cfu/g	log cfu/g	Dilution	cfu/plate	cfu/g	log cfu/g		
Pasteurized whole liquid egg Batch 1 Aerobic mesophilic flora: 10 CFU/g	<i>Klebsiella pneumoniae</i> 83	1	1327	150	2,18	10	22	220	2,34		
						100	2				
			1328	460	2,66	10	30	280	2,45		
						100	1				
			1329	240	2,38	10	30	290	2,46		
					100	2					
					1330	240	2,38	10	30	290	2,46
								100	2		
					1331	240	2,38	10	19	190	2,28
								100	2		
					1332	4300	3,63	100	82	8100	3,91
								1000	7		
					1333	24000	4,38	100	77	7500	3,88
								1000	6		
					1334	9300	3,97	100	83	8400	3,92
								1000	9		
					1335	24000	4,38	100	74	7600	3,88
								1000	10		
					1336	9300	3,97	100	77	7800	3,89
								1000	9		
		3	1337	93000	4,97	1000	78	74000	4,87		
						10000	3				
			1338	39000	4,59	1000	100	100000	5,00		
						10000	10				
			1339	110000	5,04	1000	93	93000	4,97		
					10000	9					
			1340	93000	4,97	1000	90	85000	4,93		
					10000	4					
			1341	23000	4,36	1000	69	74000	4,87		
					10000	12					
Pasteurized whole liquid egg Batch 2 Aerobic mesophilic flora: <10 CFU/g	<i>Klebsiella pneumoniae</i> 83	1	1342	240	2,38	10	26	250	2,40		
						100	1				
			1343	240	2,38	10	26	250	2,40		
						100	1				
			1344	460	2,66	10	23	210	2,32		
					100	0					
					1345	240	2,38	10	30	290	2,46
								100	2		
					1346	93	1,97	10	30	280	2,45
								100	1		
				2	1347	15000	4,18	100	92	8900	3,95
								1000	6		
					1348	9300	3,97	100	89	8500	3,93
								1000	4		
					1349	15000	4,18	100	88	8500	3,93
							1000	5			
			1350	9300	3,97	100	75	7500	3,88		
					1000	8					
			1351	15000	4,18	100	74	7200	3,86		
					1000	5					
		3	1352	240000	5,38	1000	78	81000	4,91		
						10000	11				
			1353	93000	4,97	1000	100	100000	5,00		
						10000	11				
			1354	93000	4,97	1000	88	87000	4,94		
					10000	8					
			1355	93000	4,97	1000	80	80000	4,90		
					10000	8					
			1356	93000	4,97	1000	93	88000	4,94		
					10000	4					

♦ Analyses performed according to the COFRAC accreditation

Matrix	Strain	Level	N°sample	ISO 4831*		3M Petrifilm CC -Gas producing			
				cfu/g	log cfu/g	Dilution	cfu/plate	cfu/g	log cfu/g
Raw fish fillet Batch 1 Aerobic mesophilic flora: 1,4 10 ³ CFU/g	<i>Escherichia coli</i> Ad228	1	1089	150	2,18	10	34	370	2,57
						100	7		
			1090	240	2,38	10	30	300	2,48
						100	3		
			1091	460	2,66	10	32	340	2,53
						100	5		
		1092	240	2,38	10	42	400	2,60	
					100	2			
		1093	460	2,66	10	32	300	2,48	
					100	1			
		1094	2300	3,36	100	94	9400	3,97	
					1000	9			
		1095	9300	3,97	100	86	8600	3,93	
					1000	9			
		1096	4300	3,63	100	96	9700	3,99	
					1000	11			
		1097	9300	3,97	100	93	8500	3,93	
					1000	1			
1098	9300	3,97	100	80	7800	3,89			
			1000	6					
1099	150000	5,18	1000	86	85000	4,93			
			10000	8					
1100	240000	5,38	1000	103	110000	5,04			
			10000	14					
1101	150000	5,18	1000	85	87000	4,94			
			10000	11					
1102	150000	5,18	1000	95	91000	4,96			
			10000	5					
1103	93000	4,97	1000	85	86000	4,93			
			10000	10					
1104	460	2,66	10	28	280	2,45			
			100	3					
1105	93	1,97	10	25	230	2,36			
			100	0					
1106	150	2,18	10	28	290	2,46			
			100	4					
1107	460	2,66	10	24	230	2,36			
			100	1					
1108	460	2,66	10	27	250	2,40			
			100	0					
1109	24000	4,38	100	54	5200	3,72			
			1000	3					
1110	24000	4,38	100	58	6200	3,79			
			1000	10					
1111	46000	4,66	100	63	6700	3,83			
			1000	11					
1112	4300	3,63	100	81	8700	3,94			
			1000	15					
1113	24000	4,38	100	67	6600	3,82			
			1000	6					
1114	43000	4,63	1000	65	64000	4,81			
			10000	5					
1115	93000	4,97	1000	81	83000	4,92			
			10000	10					
1116	43000	4,63	1000	92	92000	4,96			
			10000	9					
1117	75000	4,88	1000	85	85000	4,93			
			10000	8					
1118	75000	4,88	1000	70	70000	4,85			
			10000	7					

* Analyses performed according to the COFRAC accreditation

Matrix	Strain	Level	N°sample	ISO 4831*		3M Petrifilm CC -gas producing			
				cfu/g	log cfu/g	Dilution	cfu/plate	cfu/g	log cfu/g
Green peas Batch 1 Aerobic mesophilic flora: <10 CFU/g	<i>Escherichia coli</i> 19	1	1462	240	2,38	10	36	360	2,56
			100	3	360	2,56			
			1463	460			2,66	10	35
			100	4	280	2,45			
			1464	1100			3,04	10	27
		100	4	450	2,65				
		1465	1100			3,04	10	42	450
		100	7	390	2,59				
		1466	240			2,38	10	43	390
		100	0	8400	3,92				
		1467	9300			3,97	100	83	8400
		1000	9	12000	4,08				
		1468	24000			4,38	100	121	12000
		1000	13	10000	4,00				
		1469	4300			3,63	100	100	10000
		1000	13	9300	3,97				
		1470	46000			4,66	100	90	9300
		1000	12	13000	4,11				
		1471	46000			4,66	100	121	13000
		1000	22	65000	4,81				
		1472	93000			4,97	1000	71	65000
10000	1	81000	4,91						
1473	93000			4,97	1000	81	81000	4,91	
10000	8	89000	4,95						
1474	150000			5,18	1000	83	89000	4,95	
10000	15	86000	4,93						
1475	150000			5,18	1000	87	86000	4,93	
10000	8	89000	4,95						
1476	43000			4,63	1000	92	89000	4,95	
10000	6	160	2,20						
1477	460			2,66	10	16	160	2,20	
Green peas Batch 2 Aerobic mesophilic flora: <10 CFU/g	<i>Escherichia coli</i> 19	1	1478	1100	3,04	10	24	250	2,40
			100	1	250	2,40			
			1479	1100			3,04	10	34
			100	0	280	2,45			
			1480	460			2,66	10	24
		100	7	260	2,41				
		1481	240			2,38	10	25	260
		100	3	7400	3,87				
		1482	3900			3,59	100	71	7400
		1000	10	7100	3,85				
		1483	4300			3,63	100	70	7100
		1000	8	6900	3,84				
		1484	4300			3,63	100	74	6900
		1000	2	7300	3,86				
		1485	4300			3,63	100	71	7300
		1000	9	7500	3,88				
		1486	7500			3,88	100	72	7500
		1000	11	67000	4,83				
		1487	240000			5,38	1000	66	67000
		10000	8	75000	4,88				
		1488	43000			4,63	1000	77	75000
10000	5	69000	4,84						
1489	93000			4,97	1000	66	69000	4,84	
10000	10	91000	4,96						
1490	43000			4,63	1000	91	91000	4,96	
10000	9	80000	4,90						
1491	93000			4,97	1000	83	80000	4,90	
10000	5								

* Analyses performed according to the COFRAC accreditation

Appendix 5 - Accuracy profile study: summarized results

(Food) Category 1			Meats products									
(Food) Type 1			Raw meat (Ground beef)									
Sample Name	(Food) item	Level	Reference method result					Alternative method result				
			rep 1	rep 2	rep 3	rep 4	rep 5	rep 1	rep 2	rep 3	rep 4	rep 5
634-638	Ground beef	1	240	240	460	460	240	330	250	280	220	330
649-653	Ground beef	1	240	460	240	240	460	240	260	270	180	320
639-643	Ground beef	2	11000	4600	2400	4600	4600	6500	6300	6200	7100	6200
654-658	Ground beef	2	4600	4600	4600	4600	4600	6200	6200	6500	7400	5700
644-648	Ground beef	3	24000	110000	110000	46000	46000	57000	75000	64000	72000	74000
659-663	Ground beef	3	46000	24000	24000	46000	110000	68000	42000	59000	53000	74000

(Food) Category 2			Milk products									
(Food) Type 2			Pasteurized (Milk)									
Sample Name	(Food) item	Level	Reference method result					Alternative method result				
			rep 1	rep 2	rep 3	rep 4	rep 5	rep 1	rep 2	rep 3	rep 4	rep 5
833-837	Pasteurized milk	1	240	460	460	240	240	210	310	150	250	270
848-852	Pasteurized milk	1	93	460	1100	93	240	170	180	260	210	190
838-842	Pasteurized milk	2	9300	9300	9300	2300	24000	8600	8200	8900	9000	6900
853-857	Pasteurized milk	2	9300	9300	2300	2300	93600	6500	5300	5300	3600	6900
843-847	Pasteurized milk	3	93000	43000	43000	43000	93000	78000	71000	78000	89000	73000
858-862	Pasteurized milk	3	43000	93000	75000	43000	23000	64000	55000	45000	46000	60000

(Food) Category 3			Egg products and pastries									
(Food) Type 3			Liquid egg (Pasteurized whole liquid egg)									
Sample Name	(Food) item	Level	Reference method result					Alternative method result				
			rep 1	rep 2	rep 3	rep 4	rep 5	rep 1	rep 2	rep 3	rep 4	rep 5
1327-1331	Pasteurized whole liquid egg	1	150	460	240	240	240	220	280	290	290	190
1342-1346	Pasteurized whole liquid egg	1	240	240	460	240	93	250	250	210	290	280
1332-1336	Pasteurized whole liquid egg	2	4300	24000	9300	24000	9300	8100	7500	8400	7600	7800
1347-1351	Pasteurized whole liquid egg	2	15000	9300	15000	9300	15000	8900	8500	8500	7500	7200
1337-1341	Pasteurized whole liquid egg	3	93000	39000	110000	93000	23000	74000	100000	93000	85000	74000
1352-1356	Pasteurized whole liquid egg	3	240000	93000	93000	93000	93000	81000	100000	87000	80000	88000

(Food) Category 4			Seafood products									
(Food) Type 4			Raw fish (Fillet)									
Sample Name	(Food) item	Level	Reference method result					Alternative method result				
			rep 1	rep 2	rep 3	rep 4	rep 5	rep 1	rep 2	rep 3	rep 4	rep 5
1089-1093	Raw fish fillet	1	150	240	460	240	460	370	300	340	400	300
1104-1108	Raw fish fillet	1	460	93	150	460	460	280	230	290	230	250
1094-1098	Raw fish fillet	2	2300	9300	4300	9300	9300	9400	8600	9700	8500	7800
1109-1113	Raw fish fillet	2	24000	24000	46000	4300	24000	5200	6200	6700	8700	6600
1099-1103	Raw fish fillet	3	150000	240000	150000	150000	93000	85000	110000	87000	91000	86000
1114-1118	Raw fish fillet	3	43000	93000	43000	75000	75000	64000	83000	92000	85000	70000

(Food) Category 5			Vegetables									
(Food) Type 5			Raw (Green peas)									
Sample Name	(Food) item	Level	Reference method result					Alternative method result				
			rep 1	rep 2	rep 3	rep 4	rep 5	rep 1	rep 2	rep 3	rep 4	rep 5
1462-1466	Green peas	1	240	460	1100	1100	240	360	360	280	450	390
1477-1481	Green peas	1	460	1100	1100	460	240	160	250	310	280	260
1467-1471	Green peas	2	9300	24000	4300	46000	46000	8400	12000	10000	9300	13000
1482-1486	Green peas	2	3900	4300	4300	4300	7500	7400	7100	6900	7300	7500
1472-1476	Green peas	3	93000	93000	150000	150000	43000	65000	81000	89000	86000	89000
1487-1491	Green peas	3	240000	43000	93000	43000	93000	67000	75000	69000	91000	80000

Appendix 6 – Inclusivity / Exclusivity: raw data

INCLUSIVITY						
Date of analysis	N°	Strain	Replicate	ISO 4831* (BLBVB)	3M Petrifilm CC plate- (Gas producing)	
					Growth	Gas
1997	1	<i>Escherichia coli</i> CIP 54127	a/b	+/+	+/+	+/+
	2	<i>Escherichia coli</i> CIP 54117	a/b	-/+	+/+	-/-
	3	<i>Escherichia coli</i> adria 1	a/b	+/+	+/+	+/+
	4	<i>Escherichia coli</i> adria 9	a/b	+/+	+/+	-/-
	5	<i>Escherichia coli</i> adria 12	a/b	+/+	+/+	+/+
	6	<i>Escherichia coli</i> O157:H7 CIP 103571	a/b	+/+	+/+	+/+
	7	<i>Escherichia coli</i> O157:H7 ATCC 43888	a/b	-/-	+/+	-/-
	8	<i>Klebsiella pneumoniae</i> CIP 8291	a/b	-/-	+/+	+/+
	9	<i>Klebsiella pneumoniae</i> adria 28	a/b	+/+	+/+	-/-
	10	<i>Klebsiella oxytoca</i> CIP 7932	a/b	+/+	+/+	+/+
	11	<i>Klebsiella oxytoca</i> adria 57	a/b	+/+	+/+	+/+
	12	<i>Enterobacter aerogenes</i> CIP 6086	a/b	+/+	+/+	+/+
	13	<i>Enterobacter cloacae</i> adria 10	a/b	+/+	+/+	+/+
	14	<i>Cronobacter sakazakii</i> adria 7	a/b	+/+	+/+	+/+
	15	<i>Enterobacter agglomerans</i> adria 11	a/b	+/+	+/+	+/+
	16	<i>Citrobacter diversus</i> CIP 8294	a/b	d/d	+/+	-/-
	17	<i>Citrobacter freundii</i> CIP 5732	a/b	+/+	+/+	-/-
	18	<i>Citrobacter freundii</i> adria 59	a/b	+/+	+/+	-/-
	19	<i>Serratia liquefaciens</i> adria 8	a/b	-/-	+/+	+/+
	20	<i>Serratia liquefaciens</i> adria 26	a/b	-/-	+/+	+/+
	21	<i>Hafnia alvei</i> adria 168	a/b	+/+	+/+	+/+

INCLUSIVITY						
Date of analysis	N°	Strain	Origin	PCA (CFU/plate)	ISO 4831* (BLBVB)	3M Petrifilm CC plate- (gas producing)
2006	22	<i>Citrobacter diversus</i> 38	Food	67/53	-/-	0/0
	23	<i>Citrobacter freundii</i> 35	Green peas	38/30	+/+	48/39
	24	<i>Cronobacter sakazakii</i> 22	Milk	150/157	+/+	157/160
	25	<i>Enterobacter agglomerans</i> 74	Cheese	81/89	+/+	53/53
	26	<i>Cronobacter sakazakii</i> 90	Pastry	112/89	-/-	46/48
	27	<i>Enterobacter cloacae</i> Fb2	Food	38/76	-/-	0/0
	28	<i>Klebsiella oxytoca</i> 42	Food	56/75	+/+	14/20
	29	<i>Escherichia coli</i> 19	Grated carrots	175/165	+/+	71/70
	30	<i>Escherichia coli</i> 20	Well water	66/65	+/+	24/29
	31	<i>Escherichia coli</i> 14	Raw milk	149/149	+/+	132/153
	32	<i>Citrobacter Freundii</i> 175	Duck meat	160/162	-/-	0/0
	33	<i>Enterobacter sakazakii</i> 95	White cheese	114/133	+/+	142/150

* Analyses performed according to the COFRAC accreditation

INCLUSIVITY						
Date of analysis	N°	Strain	Origin	PCA CFU/plate	ISO 4831* (BLBVB)	3M Petrifilm CC plate (gas producing) CFU/Petrifilm
2018	34	<i>Escherichia coli</i> Ad1422	Infant formula	99	+	40
	35	<i>Escherichia coli</i> Ad228	Fish	54	+	44
	36	<i>Klebsiella pneumoniae</i> Ad1374	Water	76	+	17
	37	<i>Klebsiella oxytoca</i> Ad1371	Water	17	+	11
	38	<i>Enterobacter hormachei</i> Ad1373	Water	111	+	104
	39	<i>Enterobacter kobei</i> Ad706	Milk powder	73	+	65
	40	<i>Cronobacter sakazakii</i> Ad2413	Infant formula	70	+	66
	41	<i>Cronobacter malonaticus</i> E752	Baby food	33	+	0
	42	<i>Cronobacter malonaticus</i> E684	/	54	-	44
	43	<i>Citrobacter braakii</i> Ad833	Beef meat	84	+	79(gas-)
	44	<i>Citrobacter farmeri</i> Ad1116	Environment	110	+	117(gas-)
	45	<i>Citrobacter freundii</i> Ad1326	Egg product	43	+	41(gas-)
	46	<i>Citrobacter koseri</i> Ad2731	Sprouts	93	-	81(gas-)
	47	<i>Citrobacter youngae</i> Ad1372	Water	86	+	38(gas-)
	48	<i>Escherichia fergusonii</i> Ad1381	Water	30	-/-	91
	49	<i>Escherichia hermanii</i> Ad464	Raw milk	37	-	31(gas-)
	50	<i>Hafnia alvei</i> Ad2274	Pasteurized cheese	102	-	88(gas-)
	51	<i>Hafnia alvei</i> Ad1380	Water	63	-	77(gas-)

* Analyses performed according to the COFRAC accreditation

EXCLUSIVITY							
Date of analysis	N°	Strain	Origin	Repl- cate	ISO 4831♦	3M Petrifilm CC plate gas producing)	
					Gas producing	Growth	Gas producing
1997	1	<i>Shigella fleneri</i> CIP 8248	/	a/b	/	+/+	-
	2	<i>Shigella sonnei</i> ATCC 29930	/	a	-/-	+/+	-
	3	<i>Salmonella</i> Enteritidis CIP 8297	/	a	-/d	+/+	-
	4	<i>Salmonella</i> Typhimurium CIP 5858	/	a	-/d	+/+	-
	5	<i>Erwinia carotovora</i> CIP 8283	/	a	-/-	+/+	-
	6	<i>Erwinia carotovora</i> CIP 103762	/	a	-/-	-/+	-
	7	<i>Edwardsiella tarda</i> CIP 7861	/	a	/	+/+	-
	8	<i>Proteus vulgaris</i> adria 56	/	a	d/d	+/+	-
	9	<i>Yersinia enterocolitica</i> CIP 8027	/	a	d/d	+/+	-
	10	<i>Aeromonas hydrophila</i> CIP 5750	/	a	d/-	+/+	+ for 10 % of the colonies
	11	<i>Pseudomonas fluorescens</i> CIP 5690	/	a	-/d	+/+	-/-
	12	<i>Pseudomonas putida</i> 4	Poultry	a	-/-	-/-	/
	13	<i>Bacillus subtilis</i> ATCC 6633	/	a	-/-	+/+	+ for 10% of the colonies
	14	<i>Lactobacillus plantarum</i> CIP A159	/	a	/	-/-	/
	15	<i>Enterococcus faecalis</i> ATCC 29212	/	a	-/-	-/-	/
	16	<i>Staphylococcus aureus</i> CIP 658	/	a	-/-	-/-	/

EXCLUSIVITY						
Date of analysis	N°	Strain	Origin	PCA (CFU/plate)	ISO 4831♦ (Gas producing)	3M Petrifilm CC plate- gas producing)
2006	17	<i>Pseudomonas putida</i> 11	Liquid egg	92/74	-/-	0/0
	18	<i>Proteus mirabilis</i> 54	VSM	50/43	-/-	0/0
	19	<i>Providencia rettgeri</i> 12	Turkey meat	27/27	-/-	0/0
	20	<i>Providencia stuartii</i> 46	Turkey meat	26/26	-/-	0/0

♦ Analyses performed according to the COFRAC accreditation

EXCLUSIVITY							
Date of analysis	N°	Strain	Origin	PCA CFU/plate	NPP (Gaz/BLBVB)	3M Petrifilm CC CFU/Petrifilm	Identification
2018	21	<i>Aeromonas hydrophila</i> Ad1570	River water	58(-7)	growth +/ gas-	129 gas- (-6)	/
	22	<i>Ralstonia mannitolilytica</i> Ad1059	Turkey meat	103(-6)	growth -/ gas-	7 µcolonies gas- (-1)	/
	23	<i>Pseudomonas aeruginosa</i> Ad2307	Egg product	38(-7)	growth +/ gas-	0(-3)	/
	24	<i>Acinetobacter calcoaceticus</i> Ad1092	Poultry meat	99(-6)	growth -/ gas-	0(0)	/
	25	<i>Buttiauxella agrestis</i> Ad1328	Egg product	138(-6)	growth +/ gas-	116 gas-(-6)	/
	26	<i>Kluyvera ascorbata</i> Ad229	Fish	46(-7)	growth +/ gas+	90(-6)	VITEK
	27	<i>Leclercia adecarboxylata</i> Ad707	Milk powder	102(-6)	growth +/ gas+	100(-6)	16S
	28	<i>Pantoea agglomerans</i> A00L065	Cheese	95(-7)	growth +/ gas+	60(-7)	/
	29	<i>Pantoea agglomerans</i> Ad877	/	37(-7)	growth +/ gas-	22(-7)	16S
	30	<i>Raoultella terrigena</i> Ad1370	Water	77(-7)	growth +/ gas+	49(-7)	16S
	31	<i>Yersinia enterocolitica</i> Ad1028	Pork (speck)	92(-7)	growth -/ gas-	0(-4)	/

Appendix 7 – Inter-laboratory study: results obtained by the collaborators and the expert laboratory

Laboratory	Sample no	Reference method: ISO 4832					Alternative method: Test 3M™ Petrifilm™			
		Dilution	cfu/plate a	cfu/plate b	cfu/ml	log cfu/ml	Dilution	cfu/plate	cfu/ml	log cfu/ml
A	A1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	A6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	A2	1	82	89	84	1,92	1	64	60	1,78
		10	4	9			10	2		
	A7	1	54	70	65	1,81	1	50	53	1,72
		10	8	10			10	8		
	A3	10	75	80	800	2,90	10	42	400	2,60
		100	14	6			100	2		
	A8	10	51	60	600	2,78	10	35	360	2,56
		100	8	13			100	5		
	A4	100	81	124	9300	3,97	100	55	5000	3,70
		1000	0	0			1000	0		
A5	100	48	57	5500	3,74	100	39	3800	3,58	
	1000	10	5			1000	3			
B	B1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	B6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	B2	1	66	64	64	1,81	1	77	75	1,88
		10	9	1			10	5		
	B7	1	60	55	63	1,80	1	64	63	1,80
		10	14	9			10	5		
	B3	10	72	66	690	2,84	10	54	560	2,75
		100	6	8			100	7		
	B8	10	82	57	710	2,85	10	64	650	2,81
		100	5	12			100	7		
	B4	100	52	42	4600	3,66	100	40	4200	3,62
		1000	1	6			1000	6		
B5	100	70	60	6500	3,81	100	46	4700	3,67	
	1000	8	6			1000	6			

Laboratory	Sample no	Reference method: ISO 4832					Alternative method: Test 3M™ Petrifilm™			
		Dilution	cfu/plate a	cfu/plate b	cfu/ml	log cfu/ml	Dilution	cfu/plate	cfu/ml	log cfu/ml
C	C1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	C6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	C2	1	39	37	38	1,58	1	52	55	1,74
		10	3	4			10	8		
	C7	1	32	37	33	1,52	1	56	57	1,76
		10	4	0			10	7		
	C3	10	49	46	460	2,66	10	55	540	2,73
		100	3	4			100	4		
	C8	10	44	46	430	2,63	10	43	410	2,61
		100	3	2			100	2		
	C4	100	55	43	4800	3,68	100	31	3100	3,49
		1000	5	2			1000	3		
C5	100	40	32	3600	3,56	100	39	4000	3,60	
	1000	6	2			1000	5			
D	D1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	D6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	D2	1	68	80	74	1,87	1	93	85	1,93
		10	6	8			10	0		
	D7	1	62	57	62	1,79	1	63	64	1,81
		10	11	7			10	7		
	D3	10	87	61	720	2,86	10	58	560	2,75
		100	4	7			100	4		
	D8	10	64	81	690	2,84	10	67	660	2,82
		100	4	3			100	6		
	D4	100	62	55	5700	3,76	100	31	3200	3,51
		1000	5	4			1000	4		
D5	100	60	70	6600	3,82	100	40	3900	3,59	
	1000	6	10			1000	3			

Laboratory	Sample no	Reference method: ISO 4832					Alternative method: Test 3M™ Petrifilm™			
		Dilution	cfu/plate a	cfu/plate b	cfu/ml	log cfu/ml	Dilution	cfu/plate	cfu/ml	log cfu/ml
E	E1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	E6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	E2	1	81	70	73	1,86	1	80	76	1,88
		10	3	7			10	4		
	E7	1	71	98	84	1,92	1	72	68	1,83
		10	7	9			10	3		
	E3	10	56	55	620	2,79	10	68	670	2,83
		100	8	17			100	6		
	E8	10	104	91	960	2,98	10	68	650	2,81
		100	8	8			100	3		
	E4	100	81	91	8700	3,94	100	70	6900	3,84
		1000	5	14			1000	6		
E5	100	80	79	7700	3,89	100	61	6200	3,79	
	1000	6	5			1000	7			
F	F1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	F6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	F2	1	58	71	66	1,82	1	67	64	1,81
		10	7	10			10	3		
	F7	1	65	58	63	1,80	1	80	76	1,88
		10	8	8			10	4		
	F3	10	53	57	560	2,75	10	59	550	2,74
		100	5	7			100	1		
	F8	10	55	59	560	2,75	10	54	560	2,75
		100	3	5			100	7		
	F4	100	79	61	7000	3,85	100	57	5500	3,74
		1000	7	7			1000	4		
F5	100	52	53	5300	3,72	100	44	4700	3,67	
	1000	9	3			1000	8			

Laboratory	Sample no	Reference method: ISO 4832					Alternative method: Test 3M™ Petrifilm™			
		Dilution	cfu/plate a	ufc/plate b	ufc/ml	log ufc/ml	Dilution	ufc/plate	ufc/ml	log ufc/ml
G	G1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	G6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	G2	1	58	61	61	1,79	1	78	77	1,89
		10	10	6			10	7		
	G7	1	84	65	73	1,86	1	88	91	1,96
		10	5	6			10	12		
	G3	10	92	73	820	2,91	10	67	710	2,85
		100	11	5			100	11		
	G8	10	80	60	750	2,88	10	60	620	2,79
		100	11	13			100	8		
	G4	100	76	85	7800	3,89	100	67	6600	3,82
		1000	7	4			1000	6		
G5	100	88	90	9100	3,96	100	61	6100	3,79	
	1000	11	12			1000	6			
H	H1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	H6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	H2	1	69	56	62	1,79	1	73	71	1,85
		10	8	4			10	5		
	H7	1	77	67	73	1,86	1	79	76	1,88
		10	8	8			10	5		
	H3	10	66	71	690	2,84	10	54	560	2,75
		100	8	7			100	7		
	H8	10	65	73	680	2,83	10	55	560	2,75
		100	4	7			100	6		
	H4	100	68	69	6500	3,81	100	44	4200	3,62
		1000	4	1			1000	2		
H5	100	59	81	6700	3,83	100	48	5100	3,71	
	1000	3	5			1000	8			

Laboratory	Sample no	Reference method: ISO 4832					Alternative method: Test 3M™ Petrifilm™			
		Dilution	cfu/plate a	ufc/plate b	ufc/ml	log ufc/ml	Dilution	ufc/plate	ufc/ml	log ufc/ml
J	J1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	J6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	J2	1	54	60	56	1,75	1	61	62	1,79
		10	4	5			10	7		
	J7	1	56	71	65	1,81	1	46	44	1,64
		10	4	11			10	2		
	J3	10	59	57	590	2,77	10	49	490	2,69
		100	8	6			100	5		
	J8	10	110	55	850	2,93	10	51	500	2,70
		100	10	11			100	4		
	J4	100	40	48	4900	3,69	100	60	6500	3,81
		1000	9	10			1000	11		
J5	100	56	61	5900	3,77	100	39	4000	3,60	
	1000	6	7			1000	5			
K	K1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	K6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	K2	1	77	76	77	1,89	1	77	76	1,88
		10	8	8			10	7		
	K7	1	66	68	67	1,83	1	68	68	1,83
		10	6	7			10	7		
	K3	10	77	74	770	2,89	10	66	660	2,82
		100	9	9			100	6		
	K8	10	76	75	750	2,88	10	67	660	2,82
		100	7	7			100	6		
	K4	100	58	56	5700	3,76	100	51	5100	3,71
		1000	6	6			1000	5		
K5	100	60	58	5900	3,77	100	54	5500	3,74	
	1000	6	6			1000	6			

Laboratory	Sample no	Reference method: ISO 4832					Alternative method: Test 3M™ Petrifilm™			
		Dilution	cfu/plate a	cfu/plate b	cfu/ml	log cfu/ml	Dilution	cfu/plate	cfu/ml	log cfu/ml
L	L1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	L6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	L2	1	17	11	21	1,32	1	76	70	1,85
		10	11	7			10	1		
	L7	1	38	28	33	1,52	1	68	65	1,81
		10	3	4			10	4		
	L3	10	39	34	380	2,58	10	53	540	2,73
		100	6	4			100	6		
	L8	10	57	53	540	2,73	10	61	600	2,78
		100	5	4			100	5		
	L4	100	68	66	6400	3,81	100	49	4800	3,68
		1000	4	2			1000	4		
L5	100	52	60	5900	3,77	100	52	5300	3,72	
	1000	8	9			1000	6			
N	N1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	N6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	N2	1	74	81	76	1,88	1	69	68	1,83
		10	4	8			10	6		
	N7	1	96	74	88	1,94	1	90	87	1,94
		10	9	14			10	6		
	N3	10	81	83	860	2,93	10	70	680	2,83
		100	12	12			100	5		
	N8	10	102	76	920	2,96	10	61	650	2,81
		100	8	16			100	10		
	N4	100	91	101	9500	3,98	100	80	8000	3,90
		1000	7	11			1000	8		
N5	100	101	89	9900	4,00	100	51	5200	3,72	
	1000	15	12			1000	6			

Laboratory	Sample no	Reference method: ISO 4832					Alternative method: Test 3M™ Petrifilm™			
		Dilution	cfu/plate a	cfu/plate b	cfu/ml	log cfu/ml	Dilution	cfu/plate	cfu/ml	log cfu/ml
O Mesophilic aerobic microflora: 1,5.10 ³ /ml	N1	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	N6	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	N2	1	96	95	92	1,96	1	80	77	1,89
		10	8	3			10	5		
	N7	1	85	80	86	1,93	1	90	89	1,95
		10	14	10			10	8		
	N3	10	88	88	900	2,95	10	63	650	2,81
		100	11	11			100	8		
	N8	10	86	80	880	2,94	10	68	670	2,83
		100	10	17			100	6		
	N4	100	75	75	7800	3,89	100	60	5800	3,76
		1000	11	10			1000	4		
N5	100	67	66	6500	3,81	100	51	5000	3,70	
	1000	5	6			1000	4			

Laboratory	Sample no	Reference method: ISO 4832 ♦					Alternative method: Test 3M™ Petrifilm™			
		Dilution	cfu/plate a	cfu/plate b	cfu/ml	log cfu/ml	Dilution	cfu/plate	cfu/ml	log cfu/ml
ADRIA Mesophilic aerobic microflora: 1,7.10 ³ /ml	450	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	451	1	0	0	<1	0,00	1	0	<1	0,00
		10	0	0			10	0		
	452	1	46	49	47	1,67	1	64	61	1,79
		10	4	5			10	3		
	453	1	45	36	42	1,62	1	66	64	1,81
		10	4	8			10	4		
	454	10	65	58	630	2,80	10	47	480	2,68
		100	7	9			100	6		
	455	10	63	48	550	2,74	10	52	520	2,72
		100	4	5			100	5		
	456	100	73	71	7000	3,85	100	34	3500	3,54
		1000	4	6			1000	4		
457	100	49	60	5700	3,76	100	34	3500	3,54	
	1000	11	5			1000	4			

♦ Analyses performed according to the COFRAC accreditation