CERTIFICATION

AOAC Research Institute

Performance Tested Methods[SM]

Certificate No.

041701

The AOAC Research Institute hereby certifies the method known as:

Petrifilm® Lactic Acid Bacteria (LAB) Count Plate

manufactured by

Neogen Corporation
620 Lesher Place
Lansing, Michigan 48912
USA

This method has been evaluated and certified according to the policies and procedures of the AOAC *Performance Tested Methods*[SM] Program. This certificate indicates an AOAC Research Institute Certification Mark License Agreement has been executed which authorizes the manufacturer to display the AOAC Research Institute *Performance Tested Methods*[SM] certification mark on the above-mentioned method for the period below. Renewal may be granted by the Expiration Date under the rules stated in the licensing agreement.

Bradley A. Stawick, Senior Director
Signature for AOAC Research Institute

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SUBMITTING COMPANY
3M Company
3M Center, Bldg. 275-5W-05
St. Paul, MN 55144 USA

CURRENT SPONSOR
Neogen Food Safety Corporation
620 Lesher Place
Lansing, MI 48912

METHOD NAME
Neogen® Petrifilm® Lactic Acid Bacteria (LAB) Count Plate
Formerly 3M™ Petrifilm™ Lactic Acid Bacteria (LAB) Count Plate

CATALOG NUMBERS
6461, 6462

INDEPENDENT LABORATORY
Q Laboratories, Inc.
1400 Harrison Ave
Cincinnati, OH 45214 USA

APPLICABILITY OF METHOD
Target organism – Lactic acid bacteria.

Matrixes – (10 g samples) – cold smoked salmon, cream pastry, creamy salad dressing, deli chicken, deli ham, deli turkey, duck pate, pickled herring, kimchi, mayonnaise, mustard potato salad, terrines, yogurt, chicken sausage, pepperoni, cottage cheese, ready-to-bake pizza, and stainless steel (environmental surface, 4 in x 4 in)

Performance claims – Results of the validation study demonstrated no differences between the Petrifilm Lactic Acid Bacteria Count Plate method at two temperatures, 28°C and 37°C, and reference methods.

REFERENCE METHODS

The Compendium of Methods for the Microbiological Examination of Foods, 5th edition Chapter 19 (3)

International Organization for Standardization 15214: *Microbiology of food and animal feeding stuffs-Horizontal methods for the enumeration of mesophilic lactic acid bacteria – Colony- count technique at 30°C* (4)

ORIGINAL CERTIFICATION DATE
April 05, 2017

CERTIFICATION RENEWAL RECORD
Renewed through December 2026.

METHOD MODIFICATION RECORD
1. **December 2018 Level 1**
2. **November 2021 Level 1**
3. **January 2024 Level 1**

SUMMARY OF MODIFICATION
1. **Editorial changes for rebranding of labels.**
2. **Editorial changes.**
3. **Editorial changes to rebrand method from 3M to Neogen Corporation.**

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NONE

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NONE

PRINCIPLE OF THE METHOD (1)
The Neogen® Petrifilm® Lactic Acid Bacteria Count Plate is a self-contained, sample-ready-culture-medium system which contains nutrients, selective agents, a cold-water-soluble gelling agent, and a tetrazolium indicator that facilitates colony enumeration. The plate contains oxygen scavenging compounds which create an anaerobic environment for the recovery of homofermentative and heterofermentative lactic acid bacteria in the food and beverage industries. Homofermentative lactic acid bacteria primarily produce lactic acid whereas hetero-fermentative lactic acid bacteria produce gas in addition to lactic acid. On the Petrifilm Lactic Acid Bacteria Count Plate homofermentative lactic acid bacteria appear as red colonies without gas; heterofermentative colonies appear as red colonies with an associated gas bubble. When sample plates are incubated for 48 ± 3 h at 28°C to 37°C, lactic acid bacteria will appear as red colonies with or without gas production. The accurate quantitative range for lactic acid bacteria is less than 150 CFU per test for colonies with gas production or less than 300 CFU per test for colonies when no gas production is present (6).

DISCUSSION OF THE VALIDATION STUDY (1)

The data presented in this report demonstrate that the Petrifilm Lactic Acid Bacteria Count Plate method proved reliable and consistent for detection and enumeration of lactic acid bacteria when compared to the CMMEF, 5th edition Chapter 19 and ISO 15214 reference methods for a variety of matrixes. The Petrifilm Lactic Acid Bacteria Count Plate detected all 67 inclusivity strains tested, including a variety of *Enterococcus*, *Lactobacillus*, *Pediococcus*, *Streptococcus*, *Leuconostoc* and *Lactococcus* species. For the 43 exclusivity strains, none were detected by the Petrifilm Lactic Acid Bacteria Count Plate at 28°C. At 37°C, 12 of the 43 strains showed slight growth, including *Citrobacter*, *Enterobacter*, *Escherichia*, *Klebisiella*, *Listeria* and *Staphylococcus* species.

In the Method Developer matrix studies, the results of the statistical analysis using the difference of means (<0.5 log) with calculated 95% confidence interval (within the range of -0.5 to 0.5) indicated no statistical difference between the Petrifilm Lactic Acid Bacteria Count Plate at either temperature and either of the reference methods in all contamination levels analyzed for cold smoked salmon, cream pastry, deli ham, pickled herring, mayonnaise, mustard potato salad, terrines, yogurt and chicken sausage. Standard deviations were similar across methods. In some select cases for creamy salad dressing, deli chicken, duck pate, cottage cheese, ready-to-bake pizza and stainless steel, CIs were determined to be outside of the (-0.5, 0.5) range, but the mean differences between methods were <0.5 log. Results such as these can occur when the standard deviations across the five replicates being tested is high. When the variability between the replicates is consistent for both methods, and the mean differences between methods are <0.5 log, this suggests a potential issue with the sample consistency rather than a problem with the methods.

When performing the statistical analysis for deli chicken, there was a statistically significant difference in the counts between the Petrifilm Lactic Acid Bacteria Count Plate method at 37°C and CMMEF and ISO reference methods at the low contamination level, with the reference methods demonstrating higher recovery. There were no statistically significant differences at the medium or high contamination levels, or between the Petrifilm Lactic Acid Bacteria Count Plate method at 28°C and the reference methods. In addition, there was a statistically significant difference between the Petrifilm Lactic Acid Bacteria Count Plate method at 28°C and the Petrifilm Lactic Acid Bacteria Count Plate method at 37°C at the low contamination level, with higher recovery at 28°C. This data suggests that this particular sample contained a strain or strains were temperature sensitive and did not grow as well at the higher temperature. There were no statistically significant differences at the medium or high contamination levels.

For deli turkey, there were statistically significant differences in recovery between the Petrifilm Lactic Acid Bacteria Count Plate method at both 28°C and 37°C at the high contamination levels of the ISO reference method (no differences with the CMMEF method), with the ISO reference method demonstrating higher recovery. This data suggests that there was a strain or strains in this particular sample that grew better with the ISO method. There were no statistically significant differences between the Petrifilm Lactic Acid Bacteria Count Plate method at both 28°C and 37°C and the reference methods at the low or medium contamination levels. There were no statistically significant differences seen when the Petrifilm Lactic Acid Bacteria Count Plate method at 28°C was compared to the Petrifilm Lactic Acid Bacteria Count Plate method at 37°C.

For pepperoni (medium and high contamination levels) and cottage cheese (high contamination level), there was a statistically significant difference in recovery between the Petrifilm Lactic Acid Bacteria Count Plate method at 28°C and both the CMMEF and the ISO reference methods, with both reference methods demonstrating higher recovery. There were no differences at 28°C at the other contamination levels. There were no statistically significant differences between the Petrifilm Lactic Acid Bacteria Count Plate method at 37°C and the reference methods at any of the contamination levels. When comparing the Petrifilm Lactic Acid Bacteria Count Plate results at 28°C and 37°C, a significant difference was seen at the medium and high contamination levels of pepperoni with the Petrifilm Lactic Acid Bacteria Count Plate method at 37°C demonstrating higher recovery. This data suggests that the strain or strains in these particular samples preferred the higher temperature. There was no difference between the temperatures at the low contamination level.

For kimchi, there was a significant difference evident between the Petrifilm Lactic Acid Bacteria Count Plate method at both 28°C and 37°C and both the CMMEF and ISO reference methods at all contamination levels, with the reference methods demonstrating higher recovery. There were no statistically significant differences between the Petrifilm Lactic Acid Bacteria Count Plate method at 28°C and 37°C at any of the contamination levels. While statistically significant differences between the candidate and reference methods exist, the differences may be explained by the confirmed results. For the CMMEF reference method, only 20% of the isolates confirmed as lactic acid bacteria from 10 of the 15 plates in the counting range. For 5 of the 15 plates, 0% of the isolates confirmed as lactic acid bacteria. The same is true for the ISO reference method. From the Petrifilm Lactic Acid Bacteria Count Plate method at both 28°C and 37°C, 100% of the isolates confirmed as lactic acid bacteria. Further, there were no statistically significant differences between the Petrifilm Lactic Acid Bacteria Count Plate at 28°C and the Petrifilm Lactic Acid Bacteria Count Plate method at 37°C. Since *all* colonies on the reference method agar (MRS) are counted as lactic acid bacteria during routine laboratory testing, 80% of the colonies from the reference methods would be false positive for lactic acid bacteria. As a result, the reference methods would overestimate the level of lactics in this example. In this case, the Petrifilm Lactic Acid Bacteria Count Plate method at both 28°C and 37°C would prove more specific and be a more reliable method for the enumeration of lactic acid bacteria from kimchi.

In the independent evaluation, the Petrifilm Lactic Acid Bacteria Count Plate method proved reliable and consistent when compared to the CMMEF, Chapter 19 and ISO 15214 reference methods for select matrixes. The results of the statistical analysis using the difference of means with calculated 95% confidence interval indicated no statistical difference between the Petrifilm Lactic Acid Bacteria Count Plate methods and the reference methods in all contamination levels analyzed for pepperoni, chicken sausage, and ready-to-bake-pizza.

When performing the statistical analysis for the stainless steel environmental surfaces and cottage cheese, for some of the levels the CIs on the differences were outside of the (-0.5, 0.5) range, but the mean differences between methods were <0.5 log. As mentioned previously, the variability across the replicates tested (high s_r) could be contributing the increased CI. The mean differences <0.5 log suggest the methods are consistent with each other. The cottage cheese at the medium level showed the most difference between methods, significantly so for the Petrifilm Lactic Acid Bacteria Count Plate 28°C vs. ISO 15214. The strain or strains in this particular sample grew best on Petrifilm at 28°C.

Overall, the matrixes evaluated in both the Method Developer and Independent Laboratory studies (with the exception of kimchi) showed consistent results between Petrifilm Lactic Acid Bacteria Count Plate and the CMMEF and ISO reference methods. Repeatability between the methods was comparable as determined by the standard deviations of each method. The robustness evaluation demonstrated that the Petrifilm Lactic Acid Bacteria Count Plate gives consistent results across a range of temperatures and incubation time points using a variety of diluents. The candidate method offers the ability to not only detect but enumerate lactic acid bacteria colonies in as few as 45 h using aerobic incubation, while the ISO reference method requires up to 75 h to detect the presence of lactic acid bacteria and the CMMEF method requires anaerobic incubation. The small and stackable size of the Petrifilm Lactic Acid Bacteria Count Plate is proved to be an advantage if space is a factor for specific laboratories.

Table 1. Petrifilm Lactic Acid Bacteria Count Plate Inclusivity Results (1)

Organism	Source	Origin	ID Method	28°C	37°C
***Enterococcus* strains**					
Enterococcus mundii	Neogen internal isolate[a]	Food isolate	MALDI[b]	+	+
***Lactobacillus* strains**					
Lactobacillus brevis	Neogen internal isolate	Food isolate	MALDI	+	+
Lactobacillus brevis	Tecra[c]	Unknown	MALDI	+	+
Lactobacillus brevis	Neogen internal isolate	Beer	MALDI	+	+
Lactobacillus brevis	Neogen internal isolate	Beer	MALDI	+	+
Lactobacillus brevis	ATCC[d] 14869	Human feces		+	+
Lactobacillus brevis	ATCC 8287	Olives		+	+
Lactobacillus species	Tecra	Unknown	MALDI	+	+
Lactobacillus species	Tecra	Unknown	MALDI	+	+
Lactobacillus plantarum	Neogen internal isolate	Unknown	MALDI	+	+
Lactobacillus murinus	Neogen internal isolate	Food isolate	MALDI	+	+
Lactobacillus curvatus	Neogen internal isolate	Food isolate	MALDI	+	+
Lactobacillus curvatus	Neogen internal isolate	Food isolate	MALDI	+	+
Lactobacillus pentosus	Neogen internal isolate	Food isolate	MALDI	+	+
Lactobacillus plantarum	Microbiologics[e] Kwik Stik 8014	Unknown		+	+
Lactobacillus plantarum	Neogen internal isolate	Food isolate	MALDI	+	+
Lactobacillus plantarum	Neogen internal isolate	Food isolate	MALDI	+	+
Lactobacillus plantarum	Neogen internal isolate	Food isolate	MALDI	+	+
Lactobacillus plantarum	Neogen internal isolate	Chocolate	MALDI	+	+
Lactobacillus plantarum	Neogen internal isolate	Mettwurst	MALDI	+	+
Lactobacillus buchneri	Neogen internal isolate	Beer	MALDI	+	+
Lactobacillus buchneri	Neogen internal isolate	Unknown	MALDI	+	+
Lactobacillus delbruekii	Neogen internal isolate	Beer	MALDI	+	+
Lactobacillus rhamnosus	Microbiologics, Inc. Kwik Stik 7473	Unknown		+	+
Lactobacillus rhamnosus	ATCC 7469	Unknown		+	+
Lactobacillus rhamnosus	ATCC 9595	Unknown		+	+
Lactobacillus casei	ATCC 393	Dairy		+	+
Lactobacillus salivarius ssp. Salicinius	ATCC 11742	Unknown		+	+
Lactobacillus reuteri	ATCC 23272	Human feces		+	+
Lactobacillus fermentum	Neogen internal isolate	Comte	MALDI	+	+
Lactobacillus viridescens	Neogen internal isolate	Spoiled bratwurst	MALDI	+	+
Lactobacillus gasseri	Neogen internal isolate	Cottage cheese	MALDI	+	+
Lactobacillus acidophilus	Neogen internal isolate	Blue cheese	MALDI	+	+
Lactobacillus lactis	Neogen internal isolate	Unknown	MALDI	+	+
Lactobacillus paracasei ssp. *paracasei*	Neogen internal isolate	Blue cheese	MALDI	+	+
Lactobacillus paracasei ssp. *paracasei*	Neogen internal isolate	Unknown	MALDI	+	+
Lactobacillus paracasei ssp. *paracasei*	Neogen internal isolate	Unknown	MALDI	+	+
***Pediococcus* strains**					
Pediococcus acidilactici	Neogen internal isolate	Beer	MALDI	+	+
Pediococcus acidilactici	Neogen internal isolate	Proficiency organism	MALDI	+	+
Pediococcus pentosaceus	Neogen internal isolate	Food isolate	MALDI	+	+
Pediococcus pentosaceus	Neogen internal isolate	Cheese	MALDI	+	+
Pediococcus pentosaceus	Neogen internal isolate	Food isolate	MALDI	+	+
Pediococcus pentosaceus	Neogen internal isolate	Tzatziki	MALDI	+	+
Pediococcus pentasaceus	Neogen internal isolate	Buttermilk ranch dressing	MALDI	+	+
Pediococcus pentosaceus	Neogen internal isolate	Pepperoni	MALDI	+	+
***Streptococcus* Strains**					
Streptococcus salivarius	Neogen internal isolate	Food isolate	MALDI	+	+
Streptococcus salivarius	Neogen internal isolate	Bacon	MALDI	+	+
Streptococcus salivarius	Neogen internal isolate	Food isolate	MALDI	+	+
Streptococcus salivarius	Neogen internal isolate	Food isolate	MALDI	+	+
Streptococcus salivarius	Neogen internal isolate	Food isolate	MALDI	+	+
***Leuconostoc* Strains**					
Leuconostoc mesenteroides	Neogen internal isolate	Food isolate	MALDI	+	+
Leuconostoc mesenteroides ssp. *Mesenteroides*	Neogen internal isolate	Food isolate	MALDI	+	+
Leuconostoc mesenteroides ssp. *Mesenteroides*	Neogen internal isolate	Food isolate	MALDI	+	+
Leuconostoc mesenteroides ssp. *Mesenteroides*	Neogen internal isolate	Food isolate	MALDI	+	+
Leuconostoc mesenteroides ssp. *Mesenteroides*	Neogen internal isolate	Food isolate	MALDI	+	+
Leuconostoc mesenteroides ssp. *mesenteroides*	Neogen internal isolate	Food isolate	MALDI	+	+
Leuconostoc citreum	Neogen internal isolate	Food isolate	MALDI	+	+
Leuconostoc citreum	Neogen internal isolate	Food isolate	MALDI	+	+
Leuconostoc citreum	Neogen internal isolate	Food isolate	MALDI	+	+
Leuconostoc mesenteroides ssp. *Dextranicum*	Neogen internal isolate	Food isolate	MALDI	+	+
Leuconostoc mesenteroides ssp. *dextranicum*	Neogen internal isolate	Food isolate	MALDI	+	+
Leuconostoc pseudomesenteroides	Neogen internal isolate	Greek yogurt	MALDI	+	+

***Lactococcus* Strains**					
Lactococcus garvieae	Neogen internal isolate	Food isolate	MALDI	+	+
Lactococcus lactis	ATCC 49032	Unknown		+	+
*Lactococcus lactis*spp. *lactis*	ATCC 11454	Unknown		+	+
Lactococcus lactis ssp. *lactis*	Neogen internal isolate	Smoked deli ham	MALDI	+	+
Lactococcus lactis ssp. *lactis*	Neogen internal isolate	Sour cream	MALDI	+	+

[a]Neogen internal isolate, Neogen, Food Safety Department, St. Paul, MN.
[b]Matrix Assisted Laser Desorption/Ionization.
[c]Tecra, Formerly of French's Forrest, Australia.
[d]American Type Culture Collection (ATCC), Manassas, VA.
[e]Microbiologics, St. Cloud, MN.

Table 2. Petrifilm Lactic Acid Bacteria Count Plate Exclusivity Results (2)

Organism	Source	Origin	ID method	28°C	37°C
Bacillus atrophaeus	ATCC[a] 9372	Unknown		-	-
Bacillus cereus	ATCC 14579	Unknown		-	-
Bacillus megaterium	ATCC 14581	Unknown		-	-
Bacillus pumilus	Neogen internal isolate[b]	Unknown	MALDI[c]	-	-
Campylobacter jejuni	ATCC 11322	Unknown		-	-
Candida albicans	ATCC 10231	Human		-	-
Citrobacter diversus	Tecra[d] 1605	Unknown	MALDI	-	+
Citrobacter diversus	Tecra 1606	Unknown	MALDI	-	-
Citrobacter freundii	Tecra 4484	Unknown	MALDI	-	-
Citrobacter freundii	Tecra 3144	Unknown	MALDI	-	-
Citrobacter freundii	ATCC 43864	Unknown		-	-
Cronobacter sakazakii	ATCC 29544	Human		-	-
Enterobacter aerogenes	NCIMB[e] 10102	Unknown		-	+
Enterobacter amnigenus	ATCC 51816	Milk		-	-
Enterobacter cloacae	ATCC 23355	Unknown		-	+
Enterobacter hormechei	ATCC 700323	Unknown		-	-
Escerichia coli	NCTC 13216	Uknown		-	+
Escerichia coli	ATCC 11775	Urine		-	+
Escerichia coli	ATCC 11229	Unknown		-	+
Escherichia coli	ATCC 25922	Clinical isolate		-	-
Escherichia coli	ATCC 11229	Unknown		-	+
Escherichia coli	ATCC 700609	Naladixic acid mutant of ATCC 13706		-	+
Hansenula anomala	Neogen internal isolate	Unknown	MALDI	-	-
Klebselia oxytoca	ATCC 43863	Unknown		-	-
Klebselia oxytoca	ATCC 43165	Clinical isolate		-	-
Klebselia oxytoca	ATCC 700324	Unknown		-	-
Klebselia oxytoca	ATCC 51817	Milk		-	-
Klebselia pneumoniae	ATCC BAA-1144	Clinical specimen		-	-
Klebselia pneumoniae	ATCC BAA-1706	Unknown		-	-
Klebselia pneumoniae	ATCC 13882	Water		-	+
Klebselia pneumoniae	NCTC 13438	Unknown		-	+
Listeria seeligeri	ATCC 35967	Soil		-	-
Listeria monocytogenes	ATCC 7644	Human		-	+
Listeria welshimeri	ATCC 35897	Plants		-	-
Pseudomonas aeruginosa	ATCC 27853	Blood culture		-	-
Pseudomonas aeruginosa	ATCC 35554	Unknown		-	-
Saccharomyces cerevisae	ATCC 7754	Unknown		-	-
Staphylococcus aureus	ATCC 13301	Unknown		-	-
Staphylococcus aureus	ATCC 27660	Unknown		-	+
Staphylococcus aureus subsp. *aureus*	ATCC 6538	Human lesion		-	-
Staphylococcus aureus subsp. *aureus*	ATCC 25923	Clinical isolate		-	-
Staphylococcus aureus subsp. *aureus*	ATCC 49476	Unknown		-	-
Yersinia enterocolitica	ATCC 23715	Human blood		-	-

[a]American Type Culture Collection (ATCC), Manassas, VA.
[b]Neogen internal isolate, Neogen, Food Safety Department, St. Paul, MN.
[c]Matrix Assisted Laser Desorption/Ionization.
[d]Tecra, Formerly of French's Forrest, Australia.
[e]National Collections of Industrial, Marine and Food Bacteria, Bucksburn, Abderdeen, Scotland

Table 4. Matrix study: Petrifilm Lactic Acid Bacteria Count Plate 28°C vs CMMEF[a] Chapter 19 (1)

Matrix	Cont. level[b]	Petrifilm LAB 28°C			CMMEF Ch.19			Mean diff.[f]	95% CI[g]	
		Mean[c]	s_r[d]	RSD_r[e]	Mean	s_r	RSD_r		LCL[h]	UCL[i]
Cold smoked salmon[j]	Un[k]	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.177	0.073	2.298	3.182	0.113	3.551	-0.005	-0.153	0.143
	Med	4.287	0.170	3.965	4.246	0.098	2.308	0.041	-0.174	0.256
	High	5.294	0.168	3.173	5.277	0.236	4.472	0.017	-0.289	0.324
Cream pastry[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.139	0.042	1.338	3.139	0.042	1.338	0.000	-0.061	0.061
	Med	4.173	0.056	1.342	4.185	0.051	1.219	-0.012	-0.092	-0.069
	High	5.335	0.090	1.687	5.349	0.076	1.421	-0.014	-0.139	0.112
Creamy salad dressing	Low	2.647	0.230	8.689	2.653	0.191	7.199	-0.006	-0.323	0.310
	Med	3.613	0.247	6.836	3.663	0.176	4.805	-0.050	-0.371	0.271
	High	5.797	0.166	2.864	5.797	0.153	2.639	0.000	-0.176	0.039
Deli chicken	Low	3.025	0.467	15.44	2.917	0.444	15.22	0.108	-0.033	0.248
	Med	5.909	0.079	1.337	5.983	0.110	1.839	-0.074	-0.217	0.069
	High	8.068	0.088	1.091	7.983	0.133	1.666	0.085	-0.089	0.260
Deli ham	Low	4.317	0.041	0.950	4.369	0.093	2.129	-0.052	-0.169	0.064
	Med	5.439	0.129	2.372	5.420	0.092	1.697	0.019	-0.149	0.187
	High	7.129	0.074	1.038	7.200	0.063	0.875	-0.071	-0.174	0.031
Deli turkey	Low	4.334	0.121	2.792	4.426	0.052	1.175	-0.092	-0.243	0.059
	Med	6.114	0.131	2.143	6.187	0.153	2.473	-0.064	-0.277	0.149
	High	7.265	0.136	1.872	7.355	0.056	0.761	-0.090	-0.259	0.078
Duck pate	Low	3.301	0.259	7.846	3.384	0.212	6.265	-0.083	-0.252	0.086
	Med	4.130	0.269	6.513	4.207	0.278	6.608	-0.077	-0.195	0.041
	High	5.212	0.257	4.931	5.175	0.190	3.671	0.037	-0.081	0.156
Pickled herring[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.218	0.052	1.616	3.212	0.052	1.618	0.006	-0.072	0.083
	Med	4.291	0.106	2.470	4.267	0.086	2.015	0.024	-0.121	0.168
	High	5.303	0.111	2.093	5.302	0.095	1.792	0.001	-0.154	0.156
Kimchi	Low	4.549	0.074	1.627	5.188	0.110	2.120	-0.639	-0.780	-0.499
	Med	5.505	0.075	1.362	6.852	0.065	0.949	-1.347	-1.591	-1.102
	High	6.510	0.106	1.628	7.612	0.372	4.887	-1.102	-2.049	-0.156
Mayonnaise	Low	2.517	0.186	7.390	2.531	0.210	8.297	-0.014	-0.309	0.283
	Med	3.652	0.143	3.916	3.544	0.118	3.330	0.108	-0.088	0.304
	High	4.888	0.136	2.782	4.922	0.198	4.023	-0.034	-0.288	0.220
Mustard potato salad[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.194	0.074	2.317	3.217	0.095	2.953	-0.023	-0.151	0.105
	Med	4.180	0.095	2.273	4.223	0.152	3.599	-0.043	-0.240	0.153
	High	5.378	0.120	2.231	5.404	0.108	1.999	-0.026	-0.197	0.144
Terrines	Low	3.903	0.023	0.589	3.853	0.109	2.829	0.050	-0.089	0.188
	Med	5.287	0.037	0.700	5.261	0.121	2.300	0.026	-0.131	0.182
	High	7.008	0.117	1.670	6.923	0.110	1.589	0.085	-0.083	0.238
Yogurt	Low	5.887	0.062	1.053	5.888	0.055	0.934	-0.001	-0.088	0.086
	Med	6.895	0.056	0.812	6.905	0.039	0.565	-0.010	-0.082	0.062
	High	7.904	0.064	0.810	7.905	0.053	0.670	0.001	-0.089	0.087
Chicken sausage	Low	3.634	0.093	2.559	3.571	0.098	2.744	0.063	-0.080	0.205
	Med	4.696	0.104	2.215	4.649	0.115	2.474	0.047	-0.116	0.211
	High	5.281	0.106	2.007	5.446	0.071	1.304	-0.165	-0.300	-0.029
Chicken sausage[j] Ind. lab[l]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	1.693	0.068	4.000	1.699	0.055	3.254	-0.007	-0.103	0.090
	Med	2.580	0.100	3.871	2.585	0.061	2.348	-0.006	-0.138	0.127
	High	3.544	0.101	2.847	3.561	0.087	2.444	-0.017	-0.244	0.209
Pepperoni	Low	5.873	0.059	1.005	6.118	0.050	0.817	-0.245	-0.327	-0.164
	Med	6.374	0.138	2.165	7.129	0.068	0.954	-0.755	-0.933	-0.578
	High	7.358	0.133	1.808	8.075	0.070	0.867	-0.717	-0.881	-0.553
Pepperoni Ind. lab[l]	Low	5.343	0.089	1.659	5.325	0.162	3.049	0.018	-0.082	0.117
	Med	6.156	0.048	0.776	6.132	0.037	0.602	0.024	-0.048	0.096
	High	6.883	0.053	0.770	6.918	0.086	1.240	-0.036	-0.141	0.070
Cottage cheese	Low	5.323	0.129	2.423	5.473	0.087	1.590	-0.150	-0.314	0.015
	Med	6.537	0.070	1.071	6.554	0.091	1.388	-0.017	-0.138	0.150
	High	6.975	0.042	0.602	7.511	0.049	0.652	-0.536	-0.605	-0.467
Cottage cheese Ind. lab[l]	Low	4.512	0.066	1.472	4.546	0.092	2.031	-0.034	-0.162	0.094
	Med	6.879	0.141	2.049	6.395	0.172	2.688	0.485	0.270	0.699
	High	7.959	0.017	0.208	7.697	0.111	1.439	0.262	0.130	0.394
Ready-to-bake pizza	Low	5.475	0.126	2.301	5.507	0.150	2.724	-0.032	-0.239	0.175
	Med	6.533	0.110	1.684	6.506	0.091	1.399	0.028	-0.124	0.178
	High	7.835	0.356	4.544	7.879	0.311	3.947	-0.045	-0.107	0.019
Ready-to-bake	Low	2.242	0.097	4.323	2.156	0.055	2.545	0.086	-0.001	0.173

pizza Ind. lab[j]	Med	4.638	0.089	1.922	4.579	0.062	1.355	0.060	-0.074	0.193
	High	5.509	0.043	0.783	5.439	0.152	2.794	0.069	-0.097	0.235
Stainless steel[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	2.223	0.174	7.827	2.142	0.183	8.546	0.081	-0.185	0.346
	Med	4.113	0.090	2.188	4.110	0.065	1.582	0.003	-0.115	0.120
	High	5.239	0.135	2.577	5.153	0.109	2.115	0.086	-0.098	0.270
Stainless steel[j] Ind. lab[l]	Low	1.372	0.285	20.77	1.505	0.352	23.40	-0.133	-0.552	0.285
	Med	3.088	0.073	2.372	2.722	0.108	3.950	0.367	0.208	0.526
	High	3.869	0.541	1.328	3.800	0.045	1.182	0.069	-0.029	0.166

[a]Compendium of Methods for the Microbiological Examination of Foods, 5th edition Chapter 19.
[b]All matrixes are naturally contaminated unless specified with an uninoculated (Un) level.
[c]Mean of five replicate portions, plated in duplicate, after logarithmic transformation: Log_{10}[CFU/g + (0.1)f].
[d]Repeatability standard deviation.
[e]Relative standard deviation for repeatability.
[f]Mean difference between the candidate and reference methods.
[g]Confidence interval.
[h]95% Lower confidence limit for difference of means.
[i]95% Upper confidence limit for difference of means.
[j]Inoculating strains: Cold smoked salmon, *Lactococcus garvieae* (American Type Culture Collection (ATCC) 43921); cream pastry, *Lactococcus lactis* (ATCC 11454); herring, *Pediococcus pentosaceus* (ATCC 33316); mustard potato salad, *Lactobacillus plantarum* (ATCC 8014); chicken sausage (Independent Laboratory Study), *Lactobacillus casei* (ATCC 11578); stainless steel (Method Developer Study), *Lactobacillus fermentum* (National Collections of Industrial, Food and Marine Bacteria 6991); stainless steel (Independent Laboratory Study), kefir.
[k]Uninoculated matrix sample, 0 CFU/g Lactic acid bacteria.
[l]Matrix study conducted by the Independent Laboratory, Q Laboratories, Inc. (Cincinnati, OH).

Independent Laboratory Results: Table 5. Matrix study: Petrifilm Lactic Acid Bacteria Count Plate 37°C vs CMMEF[a] Chapter 19 (1)

Matrix	Cont. level[b]	Petrifilm LAB 37°C			CMMEF Ch.19			Mean diff.[f]	95% CI[g]	
		Mean[c]	s_r[d]	RSD_r[e]	Mean	s_r	RSD_r		LCL[h]	UCL[i]
Cold smoked salmon[j]	Un[k]	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.190	0.066	2.069	3.182	0.113	3.551	0.008	-0.136	0.151
	Med	4.313	0.197	4.568	4.246	0.098	2.308	0.067	-0.187	0.320
	High	5.233	0.177	3.382	5.277	0.236	4.472	-0.044	-0.355	-0.268
Cream pastry[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.312	0.043	1.373	3.139	0.042	1.338	-0.007	-0.070	0.057
	Med	4.179	0.054	1.292	4.185	0.051	1.219	-0.006	-0.085	0.073
	High	5.323	0.089	1.672	5.349	0.076	1.421	-0.026	-0.149	0.098
Creamy salad dressing	Low	2.658	0.203	7.637	2.653	0.191	7.199	0.005	-0.263	0.326
	Med	3.652	0.202	5.531	3.663	0.176	4.805	-0.011	-0.294	0.273
	High	5.847	0.184	3.147	5.797	0.153	2.639	0.050	-0.203	0.304
Deli chicken	Low	2.339	0.247	10.56	2.917	0.444	15.22	-0.578	-0.933	-0.225
	Med	5.857	0.085	1.451	5.983	0.110	1.839	-0.126	-0.273	0.021
	High	7.975	0.143	1.793	7.983	0.133	1.666	-0.008	-0.214	0.199
Deli ham	Low	4.336	0.056	1.292	4.369	0.093	2.129	-0.033	-0.132	0.066
	Med	5.343	0.106	1.984	5.420	0.092	1.697	-0.077	-0.255	0.072
	High	7.068	0.080	1.132	7.200	0.063	0.875	-0.132	-0.241	-0.025
Deli turkey	Low	4.299	0.044	1.023	4.426	0.052	1.175	0.127	-0.198	-0.055
	Med	6.187	0.084	1.358	6.187	0.153	2.473	-0.009	-0.182	0.200
	High	7.247	0.182	2.511	7.355	0.056	0.761	-0.108	-0.345	0.130
Duck pate	Low	3.304	0.277	6.870	3.384	0.212	6.265	-0.080	-0.187	0.026
	Med	4.141	0.355	8.573	4.207	0.278	6.608	-0.066	-0.188	0.056
	High	5.098	0.340	6.669	5.175	0.190	3.671	-0.077	-0.302	0.151
Pickled herring[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.234	0.048	1.484	3.212	0.052	1.618	0.022	-0.054	0.096
	Med	4.314	0.116	2.689	4.267	0.086	2.015	0.047	-0.105	0.200
	High	5.304	0.076	1.433	5.302	0.095	1.792	0.002	-0.127	0.131
Kimchi	Low	4.430	0.037	0.835	5.188	0.110	2.120	-0.745	-0.889	-0.601
	Med	5.411	0.064	1.183	6.852	0.065	0.949	-1.411	-2.127	-0.745
	High	6.467	0.136	2.103	7.612	0.372	4.887	-1.145	-2.106	-0.184
Mayonnaise	Low	2.524	0.139	5.507	2.531	0.210	8.297	-0.007	-0.280	0.271
	Med	3.577	0.104	2.907	3.544	0.118	3.330	0.033	-0.133	0.199
	High	4.824	0.219	4.540	4.922	0.198	4.023	-0.098	-0.411	0.214
Mustard potato salad[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.193	0.079	2.474	3.217	0.095	2.953	-0.024	-0.155	0.107

	Med	4.187	0.081	1.935	4.223	0.152	3.599	-0.036	-0.255	0.153
	High	5.380	0.109	2.026	5.404	0.108	1.999	-0.024	-0.187	0.138
	Low	3.934	0.065	1.652	3.853	0.109	2.829	0.081	-0.059	0.220
Terrines	Med	5.289	0.056	1.059	5.261	0.121	2.300	0.028	-0.125	0.181
	High	7.007	0.114	1.633	6.923	0.110	1.589	0.084	-0.083	0.252
	Low	5.886	0.058	0.985	5.888	0.055	0.934	-0.002	-0.087	0.081
Yogurt	Med	6.896	0.076	1.102	6.905	0.039	0.565	-0.009	-0.108	0.089
	High	7.927	0.073	0.921	7.905	0.053	0.670	0.022	-0.074	0.117
	Low	3.627	0.121	3.336	3.571	0.098	2.744	0.056	-0.109	0.220
Chicken sausage	Med	4.646	0.090	1.937	4.649	0.115	2.474	-0.003	-0.158	0.151
	High	5.406	0.044	0.814	5.446	0.071	1.304	-0.040	-0.131	0.052
	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
Chicken sausage[j] Ind. lab[l]	Low	1.667	0.356	2.141	1.699	0.055	3.254	-0.032	-0.085	0.020
	Med	2.557	0.101	3.965	2.585	0.061	2.348	-0.029	-0.098	0.040
	High	3.578	0.045	1.248	3.561	0.087	2.444	0.017	-0.105	0.139
	Low	6.076	0.073	1.201	6.118	0.050	0.817	-0.042	-0.137	0.052
Pepperoni	Med	7.153	0.077	1.076	7.129	0.068	0.954	0.024	-0.086	0.133
	High	8.175	0.088	1.076	8.075	0.070	0.867	0.100	-0.019	0.219
	Low	5.394	0.108	2.003	5.325	0.162	3.049	0.069	-0.057	0.195
Pepperoni Ind. lab[l]	Med	6.198	0.023	0.369	6.132	0.037	0.602	0.066	-0.007	0.138
	High	6.871	0.038	0.557	6.918	0.086	1.240	-0.047	-0.159	0.065
	Low	5.217	0.098	1.878	5.473	0.087	1.590	-0.256	-0.395	-0.119
Cottage cheese	Med	6.364	0.123	1.933	6.554	0.091	1.388	-0.190	-0.035	-0.028
	High	7.096	0.094	1.325	7.511	0.049	0.652	-0.415	-0.531	-0.299
Cottage cheese Ind. lab[l]	Low	4.493	0.087	1.939	4.546	0.092	2.031	-0.054	-0.198	0.090
	Med	6.403	0.092	1.434	6.395	0.172	2.688	0.009	-0.095	0.113
	High	7.729	0.098	1.262	7.697	0.111	1.439	0.032	-0.085	0.051
	Low	5.316	0.148	2.784	5.507	0.150	2.724	-0.191	-0.413	0.150
Ready-to-bake pizza	Med	6.431	0.118	1.835	6.506	0.091	1.399	-0.075	-0.233	0.083
	High	7.798	0.343	4.399	7.879	0.311	3.947	-0.081	-0.135	-0.027
Ready-to-bake pizza Ind. lab[l]	Low	2.200	0.063	2.878	2.156	0.055	2.545	0.045	-0.031	0.120
	Med	4.638	0.082	1.760	4.579	0.062	1.355	0.059	-0.029	0.147
	High	5.493	0.101	1.846	5.439	0.152	2.794	0.054	-0.163	0.270
	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
Stainless steel[j]	Low	2.078	0.244	11.74	2.142	0.183	8.546	-0.064	-0.384	0.257
	Med	4.088	0.078	1.908	4.110	0.065	1.582	-0.022	-0.129	0.085
	High	5.285	0.054	1.022	5.153	0.109	2.115	0.132	-0.007	0.272
Stainless steel[j] Ind. lab[l]	Low	1.658	0.263	15.87	1.505	0.352	23.40	0.152	-0.014	0.317
	Med	3.078	0.043	1.390	2.722	0.108	3.950	0.367	0.189	0.523
	High	3.833	0.090	2.356	3.800	0.045	1.182	0.033	-0.115	0.180

[a]Compendium of Methods for the Microbiological Examination of Foods, 5th edition Chapter 19.

[b]All matrixes are naturally contaminated unless specified with an uninoculated (Un) level.

[c]Mean of five replicate portions, plated in duplicate, after logarithmic transformation: Log_{10}[CFU/g + (0.1)f].

[d]Repeatability standard deviation.

[e]Relative standard deviation for repeatability.

[f]Mean difference between the candidate and reference methods.

[g]Confidence interval.

[h]95% Lower confidence limit for difference of means.

[i]95% Upper confidence limit for difference of means.

[j]Inoculating strains: Cold smoked salmon, *Lactococcus garvieae* (American Type Culture Collection (ATCC) 43921); cream pastry, *Lactococcus lactis* (ATCC 11454); herring, *Pediococcus pentosaceus* (ATCC 33316); mustard potato salad, *Lactobacillus plantarum* (ATCC 8014); chicken sausage (Independent Laboratory Study), *Lactobacillus casei* (ATCC 11578); stainless steel (Method Developer Study), *Lactobacillus fermentum* (National Collections of Industrial, Food and Marine Bacteria 6991); stainless steel (Independent Laboratory Study), kefir.

[k]Uninoculated matrix sample, 0 CFU/g Lactic acid bacteria.

[l]Matrix study conducted by the Independent Laboratory, Q Laboratories, Inc. (Cincinnati, OH).

Independent Laboratory Results: Table 6. Matrix study: Petrifilm Lactic Acid Bacteria Count Plate 28°C vs ISO 15214[a] (1)

Matrix	Cont. level[b]	Petrifilm LAB 28°C			ISO 15214			Mean diff.[f]	95% CI[g]	
		Mean[c]	s_r[d]	RSD_r[e]	Mean	s_r	RSD_r		LCL[h]	UCL[i]
Cold smoked salmon[j]	Un[k]	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.177	0.073	2.298	3.195	0.062	1.941	-0.018	-0.120	0.084
	Med	4.287	0.170	3.965	4.227	0.059	1.396	0.060	-0.160	0.284
	High	5.294	0.168	3.173	5.290	0.143	2.703	0.004	-0.234	0.234
Cream pastry[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.139	0.042	1.338	3.138	0.051	1.625	0.001	-0.069	0.071
	Med	4.173.	0.056	1.342	4.168	0.043	1.031	0.005	-0.070	0.080
	High	5.335	0.090	1.687	5.320	0.106	1.992	0.015	-0.132	0.162
Creamy salad dressing	Low	2.647	0.230	8.689	2.912	0.073	2.507	-0.265	-0.565	0.036
	Med	3.613	0.247	6.836	3.873	0.087	2.246	-0.260	-0.585	0.065
	High	5.797	0.166	2.864	6.017	0.149	2.476	-0.220	-0.455	0.016
Deli chicken	Low	3.025	0.467	15.44	2.839	0.391	13.77	0.176	-0.457	0.830
	Med	5.909	0.079	1.337	5.920	0.099	1.672	-0.011	-0.145	0.124
	High	8.068	0.088	1.091	7.934	0.140	1.765	0.134	-0.047	0.316
Deli ham	Low	4.317	0.041	0.950	4.280	0.174	4.065	0.037	-0.186	0.259
	Med	5.439	0.129	2.372	5.393	0.096	1.780	0.046	-0.124	0.217
	High	7.129	0.074	1.038	7.170	0.082	1.144	-0.041	-0.158	0.075
Deli turkey	Low	4.334	0.121	2.792	4.382	0.079	1.803	-0.048	-0.206	0.110
	Med	6.114	0.131	2.143	6.247	0.091	1.457	-0.133	-0.302	0.036
	High	7.265	0.136	1.872	8.051	0.342	4.248	-0.786	-1.209	-0.364
Duck pate	Low	3.301	0.259	7.846	3.202	0.166	5.184	0.099	-0.237	0.406
	Med	4.130	0.269	6.513	4.225	0.131	3.101	-0.095	-0.439	0.249
	High	5.212	0.257	4.931	5.206	0.224	4.303	0.006	-0.354	0.367
Pickled herring[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.218	0.052	1.616	3.235	0.079	2.442	-0.017	-0.120	0.086
	Med	4.291	0.106	2.470	4.265	0.096	2.251	0.026	-0.126	0.177
	High	5.303	0.111	2.093	5.338	0.090	1.686	-0.035	-0.187	0.115
Kimchi	Low	4.549	0.074	1.627	5.340	0.262	4.906	-0.791	-1.457	-0.125
	Med	5.505	0.075	1.362	6.549	0.166	2.535	-1.044	-1.330	-0.758
	High	6.510	0.106	1.628	7.851	0.166	2.114	-1.341	-1.681	-1.001
Mayonnaise	Low	2.517	0.186	7.390	2.578	0.078	3.026	-0.061	-0.292	0.171
	Med	3.652	0.143	3.916	3.640	0.062	1.703	0.012	-0.167	0.190
	High	4.888	0.136	2.782	4.988	0.087	1.744	-0.100	-0.277	0.076
Mustard potato salad[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.194	0.074	2.317	3.229	0.047	1.456	-0.035	-0.131	0.062
	Med	4.180	0.095	2.273	4.205	0.070	1.665	-0.025	-0.150	0.099
	High	5.378	0.120	2.231	5.248	0.085	1.620	0.130	-0.026	0.285
Terrines	Low	3.903	0.023	0.589	3.936	0.173	4.395	-0.033	-0.250	0.184
	Med	5.287	0.037	0.700	5.218	0.185	3.545	0.069	-0.165	0.303
	High	7.008	0.117	1.670	6.753	0.170	2.517	0.255	0.029	0.466
Yogurt	Low	5.887	0.062	1.053	5.863	0.071	1.211	0.024	-0.076	0.124
	Med	6.895	0.056	0.812	6.878	0.063	0.916	0.017	-0.072	0.105
	High	7.904	0.064	0.810	7.872	0.157	1.994	0.032	-0.163	0.226
Chicken sausage	Low	3.634	0.093	2.559	3.710	0.072	1.941	-0.076	-0.200	0.048
	Med	4.696	0.104	2.215	4.694	0.076	1.619	0.002	-0.133	0.139
	High	5.281	0.106	2.007	5.376	0.070	1.302	-0.095	-0.233	0.045
Chicken sausage[j] Ind. lab[l]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	1.693	0.068	4.000	1.619	0.051	3.123	0.074	-0.013	0.161
	Med	2.580	0.100	3.871	2.595	0.123	4.719	-0.016	-0.178	0.148
	High	3.544	0.101	2.847	3.631	0.068	1.870	-0.087	-0.212	0.039
Pepperoni	Low	5.873	0.059	1.005	6.118	0.056	0.915	-0.245	-0.330	-0.159
	Med	6.374	0.138	2.165	7.175	0.086	1.199	-0.801	-0.980	-0.623
	High	7.358	0.133	1.808	8.078	0.087	1.077	-0.720	-0.893	-0.546
Pepperoni Ind. lab[l]	Low	5.343	0.089	1.659	5.276	0.059	1.121	0.068	-0.042	0.177
	Med	6.156	0.048	0.776	6.144	0.049	0.804	0.012	-0.058	0.083
	High	6.883	0.053	0.770	6.900	0.044	0.631	-0.018	-0.088	0.053
Cottage cheese	Low	5.323	0.129	2.423	5.430	0.070	1.289	-0.107	-0.267	0.054
	Med	6.537	0.070	1.071	6.666	0.068	1.020	-0.129	-0.232	-0.026
	High	6.975	0.042	0.602	7.487	0.068	0.908	-0.512	-0.600	-0.424
Cottage cheese Ind. lab[l]	Low	4.512	0.066	1.472	4.506	0.041	0.919	0.006	-0.075	0.086
	Med	6.879	0.141	2.049	5.910	0.272	4.605	0.970	0.653	1.286
	High	7.959	0.017	0.208	7.656	0.118	1.541	0.303	0.180	0.426
Ready-to-bake pizza	Low	5.475	0.126	2.301	5.544	0.196	3.535	-0.069	-0.324	0.186
	Med	6.533	0.110	1.684	6.517	0.196	3.008	0.016	-0.230	0.262
	High	7.835	0.356	4.544	8.129	0.448	5.511	-0.294	-0.899	0.310

Ready-to-bake pizza Ind. lab[i]	Low	2.242	0.097	4.323	2.187	0.083	3.775	0.055	-0.076	0.186
	Med	4.638	0.089	1.922	4.546	0.075	1.641	0.092	-0.028	0.212
	High	5.509	0.043	0.783	5.492	0.074	1.350	0.017	-0.072	0.105
Stainless steel[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	2.223	0.174	7.827	2.111	0.353	16.77	0.112	-0.339	0.599
	Med	4.113	0.090	2.188	4.100	0.073	1.780	0.013	-0.111	0.135
	High	5.239	0.135	2.577	5.062	0.084	1.659	0.177	0.003	0.351
Stainless steel[j] Ind. lab[i]	Low	1.372	0.285	20.77	1.670	0.107	6.375	-0.297	-0.610	0.015
	Med	3.088	0.073	2.372	3.069	0.054	1.761	0.019	-0.075	0.113
	High	3.869	0.541	1.328	3.803	0.022	0.574	0.066	-0.009	0.124

[a]ISO 15214: *Microbiology of food and animal feeding stuffs-Horizontal method for the enumeration of mesophilic lactic acid bacteria – colony-count technique at 30°C.*
[b]All matrixes are naturally contaminated unless specified with an uninoculated (Un) level.
[c]Mean of five replicate portions, plated in duplicate, after logarithmic transformation: Log_{10}[CFU/g + (0.1)f].
[d]Repeatability standard deviation.
[e]Relative standard deviation for repeatability.
[f]Mean difference between the candidate and reference methods.
[g]Confidence interval.
[h]95% Lower confidence limit for difference of means.
[i]95% Upper confidence limit for difference of means.
[j]Inoculating strains: Cold smoked salmon, *Lactococcus garvieae* (American Type Culture Collection (ATCC) 43921); cream pastry, *Lactococcus lactis* (ATCC 11454); herring, *Pediococcus pentosaceus* (ATCC 33316); mustard potato salad, *Lactobacillus plantarum* (ATCC 8014); chicken sausage (Independent Laboratory Study), *Lactobacillus casei* (ATCC 11578); stainless steel (Method Developer Study), *Lactobacillus fermentum* (National Collections of Industrial, Food and Marine Bacteria 6991); stainless steel (Independent Laboratory Study), kefir.
[k]Uninoculated matrix sample, 0 CFU/g Lactic acid bacteria.
[l]Matrix study conducted by the Independent Laboratory, Q Laboratories, Inc. (Cincinnati, OH).

Independent Laboratory Results: Table 7. Matrix study: Petrifilm Lactic Acid Bacteria Count Plate 37°C vs ISO 15214[a] (1)

Matrix	Cont. level[b]	Petrifilm LAB 37°C			ISO 15214			Mean diff.[f]	95% CI[g]	
		Mean[c]	s_r[d]	RSD_r[e]	Mean	s_r	RSD_r		LCL[h]	UCL[i]
Cold smoked salmon[j]	Un[k]	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.190	0.066	2.069	3.195	0.062	1.941	-0.005	-0.102	0.090
	Med	4.313	0.197	4.568	4.227	0.059	1.396	0.086	-0.170	0.341
	High	5.233	0.177	3.382	5.290	0.143	2.703	-0.057	-0.302	0.179
Cream pastry[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.312	0.043	1.373	3.138	0.051	1.625	-0.006	-0.076	0.065
	Med	4.179	0.054	1.292	4.168	0.043	1.031	0.011	-0.063	0.084
	High	5.323	0.089	1.672	5.320	0.106	1.992	0.003	-0.143	0.149
Creamy salad dressing	Low	2.658	0.203	7.637	2.912	0.073	2.507	-0.254	-0.475	0.021
	Med	3.652	0.202	5.531	3.873	0.087	2.246	-0.221	-0.473	0.032
	High	5.847	0.184	3.147	6.017	0.149	2.476	-0.170	-0.420	0.081
Deli chicken	Low	2.339	0.247	10.56	2.839	0.391	13.77	-0.500	-1.006	0.006
	Med	5.857	0.085	1.451	5.920	0.099	1.672	-0.063	-0.201	0.076
	High	7.975	0.143	1.793	7.934	0.140	1.765	0.041	-0.171	0.253
Deli ham	Low	4.336	0.056	1.292	4.280	0.174	4.065	0.056	-0.172	0.283
	Med	5.343	0.106	1.984	5.393	0.096	1.780	-0.050	-0.200	0.102
	High	7.068	0.080	1.132	7.170	0.082	1.144	-0.102	-0.224	0.019
Deli turkey	Low	4.299	0.044	1.023	4.382	0.079	1.803	-0.083	-0.181	0.016
	Med	6.187	0.084	1.358	6.247	0.091	1.457	-0.060	-0.191	0.071
	High	7.247	0.182	2.511	8.051	0.342	4.248	-0.804	-1.228	-0.380
Duck pate	Low	3.304	0.277	6.870	3.202	0.166	5.184	0.102	-0.195	0.399
	Med	4.141	0.355	8.573	4.225	0.131	3.101	-0.084	-0.519	0.350
	High	5.098	0.340	6.669	5.206	0.224	4.303	-0.108	-0.553	0.339
Pickled herring[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.234	0.048	1.484	3.235	0.079	2.442	-0.001	-0.102	0.100
	Med	4.314	0.116	2.689	4.265	0.096	2.251	0.049	-0.110	0.208
	High	5.304	0.076	1.433	5.338	0.090	1.686	-0.035	-0.159	0.090
Kimchi	Low	4.430	0.037	0.835	5.340	0.262	4.906	-0.897	-1.152	-0242
	Med	5.411	0.064	1.183	6.549	0.166	2.535	-1.138	1.418	-0.858
	High	6.467	0.136	2.103	7.851	0.166	2.114	-1.384	-1.745	-1.023
Mayonnaise	Low	2.524	0.139	5.507	2.578	0.078	3.026	-0.054	-0.226	0.123
	Med	3.577	0.104	2.907	3.640	0.062	1.703	-0.063	-0.195	0.069
	High	4.824	0.219	4.540	4.988	0.087	1.744	-0.164	-0.436	0.106
Mustard potato salad[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.193	0.079	2.474	3.229	0.047	1.456	-0.036	-0.137	0.066
	Med	4.187	0.081	1.935	4.205	0.070	1.665	-0.018	-0.131	0.096
	High	5.380	0.109	2.026	5.248	0.085	1.620	0.132	-0.015	0.278
Terrines	Low	3.934	0.065	1.652	3.936	0.173	4.395	-0.002	-0.215	0.211
	Med	5.289	0.056	1.059	5.218	0.185	3.545	0.071	-0.168	0.312
	High	7.007	0.114	1.633	6.753	0.170	2.517	0.254	0.030	0.478
Yogurt	Low	5.886	0.058	0.985	5.863	0.071	1.211	0.023	-0.075	0.119

	Med	6.896	0.076	1.102	6.878	0.063	0.916	0.018	-0.087	0.122
	High	7.927	0.073	0.921	7.872	0.157	1.994	0.055	-0.144	0.253
Chicken sausage	Low	3.627	0.121	3.336	3.710	0.072	1.941	0.056	-0.109	0.220
	Med	4.646	0.090	1.937	4.694	0.076	1.619	-0.003	-0.158	0.151
	High	5.406	0.044	0.814	5.376	0.070	1.302	-0.040	-0.131	0.052
Chicken sausage[j] Ind. lab[l]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	1.667	0.356	2.141	1.619	0.051	3.123	0.048	-0.015	0.112
	Med	2.557	0.101	3.965	2.595	0.123	4.719	-0.039	-0.203	0.125
	High	3.578	0.045	1.248	3.631	0.068	1.870	-0.053	-0.137	0.031
Pepperoni	Low	6.076	0.073	1.201	6.118	0.056	0.915	-0.042	-0.139	0.055
	Med	7.153	0.077	1.076	7.175	0.086	1.199	-0.022	-0.145	0.100
	High	8.175	0.088	1.076	8.078	0.087	1.077	0.097	-0.034	0.228
Pepperoni Ind. lab[l]	Low	5.394	0.108	2.003	5.276	0.059	1.121	0.119	-0.008	0.246
	Med	6.198	0.023	0.369	6.144	0.049	0.804	0.054	-0.002	0.110
	High	6.871	0.038	0.557	6.900	0.044	0.631	-0.029	-0.066	0.008
Cottage cheese	Low	5.217	0.098	1.878	5.430	0.070	1.289	-0.213	-0.340	-0.087
	Med	6.364	0.123	1.933	6.666	0.068	1.020	-0.302	-0.457	-0.149
	High	7.096	0.094	1.325	7.487	0.068	0.908	-0.391	-0.514	-0.269
Cottage cheese Ind. lab[l]	Low	4.493	0.087	1.939	4.506	0.041	0.919	-0.014	-0.113	0.086
	Med	6.403	0.092	1.434	5.910	0.272	4.605	0.494	0.194	0.793
	High	7.729	0.098	1.262	7.656	0.118	1.541	0.073	-0.085	0.231
Ready-to-bake pizza	Low	5.316	0.148	2.784	5.544	0.196	3.535	-0.228	-0.488	0.032
	Med	6.431	0.118	1.835	6.517	0.196	3.008	-0.086	-0.337	0.165
	High	7.798	0.343	4.399	8.129	0.448	5.511	-0.331	-0.928	0.265
Ready-to-bake pizza Ind. lab[l]	Low	2.200	0.063	2.878	2.187	0.083	3.775	0.014	-0.115	0.143
	Med	4.638	0.082	1.760	4.546	0.075	1.641	0.091	-0.023	0.205
	High	5.493	0.101	1.846	5.492	0.074	1.350	0.001	-0.128	0.131
Stainless steel[j]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	2.078	0.244	11.74	2.111	0.353	16.77	-0.033	-0.484	0.416
	Med	4.088	0.078	1.908	4.100	0.073	1.780	-0.012	-0.012	0.100
	High	5.285	0.054	1.022	5.062	0.084	1.659	0.223	0.114	0.332
Stainless steel[j] Ind. lab[l]	Low	1.658	0.263	15.87	1.670	0.107	6.375	-0.012	-0.304	0.280
	Med	3.078	0.043	1.390	3.069	0.054	1.761	0.008	-0.063	0.079
	High	3.833	0.090	2.356	3.803	0.022	0.574	0.030	-0.066	0.126

[a]ISO 15214: *Microbiology of food and animal feeding stuffs-Horizontal method for the enumeration of mesophilic lactic acid bacteria – colony-count technique at 30°C.*
[b]All matrixes are naturally contaminated unless specified with an uninoculated (Un) level.
[c]Mean of five replicate portions, plated in duplicate, after logarithmic transformation: Log_{10}[CFU/g + (0.1)f].
[d]Repeatability standard deviation.
[e]Relative standard deviation for repeatability.
[f]Mean difference between the candidate and reference methods.
[g]Confidence interval.
[h]95% Lower confidence limit for difference of means.
[i]95% Upper confidence limit for difference of means.
[j]Inoculating strains: Cold smoked salmon, *Lactococcus garvieae* (American Type Culture Collection (ATCC) 43921); cream pastry, *Lactococcus lactis* (ATCC 11454); herring, *Pediococcus pentosaceus* (ATCC 33316); mustard potato salad, *Lactobacillus plantarum* (ATCC 8014); chicken sausage (Independent Laboratory Study), *Lactobacillus casei* (ATCC 11578); stainless steel (Method Developer Study), *Lactobacillus fermentum* (National Collections of Industrial, Food and Marine Bacteria 6991); stainless steel (Independent Laboratory Study), kefir.
[k]Uninoculated matrix sample, 0 CFU/g Lactic acid bacteria.
[l]Matrix study conducted by the Independent Laboratory, Q Laboratories, Inc. (Cincinnati, OH).

Independent Laboratory Results: Table 8. Matrix study: Petrifilm Lactic Acid Bacteria Count Plate 28°C vs Petrifilm Lactic Acid Bacteria Count Plate 37°C (1)

Matrix	Cont. level[a]	Petrifilm LAB 28°C			Petrifilm LAB 37°C			Mean diff.[e]	95% CI[f]	
		Mean[b]	s_r[c]	RSD_r[d]	Mean	s_r	RSD_r		LCL[g]	UCL[h]
Cold smoked salmon[i]	Un[j]	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.177	0.073	2.298	3.190	0.066	2.069	-0.013	-0.117	0.092
	Med	4.287	0.170	3.965	4.313	0.197	4.568	-0.026	-0.092	0.041
	High	5.294	0.168	3.173	5.233	0.177	3.382	0.061	-0.056	0.179
Cream pastry[i]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.139	0.042	1.338	3.312	0.043	1.373	0.007	-0.057	0.070
	Med	4.173.	0.056	1.342	4.179	0.054	1.292	-0.006	-0.089	0.077
	High	5.335	0.090	1.687	5.323	0.089	1.672	0.012	-0.122	0.146
Creamy salad dressing	Low	2.647	0.230	8.689	2.658	0.203	7.637	-0.011	-0.362	0.287
	Med	3.613	0.247	6.836	3.652	0.202	5.531	-0.039	-0.377	0.298
	High	5.797	0.166	2.864	5.847	0.184	3.147	-0.050	-0.312	0.213
Deli chicken	Low	3.025	0.467	15.44	2.339	0.247	10.56	0.686	0.108	1.265
	Med	5.909	0.079	1.337	5.857	0.085	1.451	0.052	-0.071	0.175
	High	8.068	0.088	1.091	7.975	0.143	1.793	0.093	-0.091	0.277
Deli ham	Low	4.317	0.041	0.950	4.336	0.056	1.292	-0.018	-0.093	0.055
	Med	5.439	0.129	2.372	5.343	0.106	1.984	0.096	-0.081	0.273

	High	7.129	0.074	1.038	7.068	0.080	1.132	0.061	-0.054	0.177
Deli turkey	Low	4.334	0.121	2.792	4.299	0.044	1.023	0.035	-0.114	0.182
	Med	6.114	0.131	2.143	6.187	0.084	1.358	-0.073	-0.243	0.098
	High	7.265	0.136	1.872	7.247	0.182	2.511	0.018	-0.223	0.258
Duck pate	Low	3.301	0.259	7.846	3.304	0.277	6.870	-0.003	-0.108	0.103
	Med	4.130	0.269	6.513	4.141	0.355	8.573	-0.011	-0.178	0.157
	High	5.212	0.257	4.931	5.098	0.340	6.669	0.114	-0.059	0.287
Pickled herring[i]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.218	0.052	1.616	3.234	0.048	1.484	-0.016	-0.090	0.059
	Med	4.291	0.106	2.470	4.314	0.116	2.689	-0.023	-0.190	0.143
	High	5.303	0.111	2.093	5.304	0.076	1.433	-0.001	-0.144	0.141
Kimchi	Low	4.549	0.074	1.627	4.430	0.037	0.835	0.119	0.011	0.201
	Med	5.505	0.075	1.362	5.411	0.064	1.183	0.094	-0.011	0.199
	High	6.510	0.106	1.628	6.467	0.136	2.103	0.043	-0.140	0.225
Mayonnaise	Low	2.517	0.186	7.390	2.524	0.139	5.507	-0.007	-0.253	0.237
	Med	3.652	0.143	3.916	3.577	0.104	2.907	0.075	-0.112	0.261
	High	4.888	0.136	2.782	4.824	0.219	4.540	0.064	-0.218	0.347
Mustard potato salad[i]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	3.194	0.074	2.317	3.193	0.079	2.474	0.001	-0.114	0.116
	Med	4.180	0.095	2.273	4.187	0.081	1.935	-0.007	-0.140	0.124
	High	5.378	0.120	2.231	5.380	0.109	2.026	-0.002	-0.174	0.170
Terrines	Low	3.903	0.023	0.589	3.934	0.065	1.652	-0.031	-0.012	0.055
	Med	5.287	0.037	0.700	5.289	0.056	1.059	-0.002	-0.076	0.071
	High	7.008	0.117	1.670	7.007	0.114	1.633	-0.001	-0.172	0.173
Yogurt	Low	5.887	0.062	1.053	5.886	0.058	0.985	0.001	-0.088	0.091
	Med	6.895	0.056	0.812	6.896	0.076	1.102	-0.001	-0.101	0.099
	High	7.904	0.064	0.810	7.927	0.073	0.921	-0.023	-0.125	0.079
Chicken sausage	Low	3.634	0.093	2.559	3.627	0.121	3.336	0.007	-0.154	0.168
	Med	4.696	0.104	2.215	4.646	0.090	1.937	0.050	-0.095	0.196
	High	5.281	0.106	2.007	5.406	0.044	0.814	-0.125	-0.257	0.007
Chicken sausage[j] Ind. lab[k]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	1.693	0.068	4.000	1.667	0.356	2.141	0.026	-0.024	0.075
	Med	2.580	0.100	3.871	2.557	0.101	3.965	0.023	-0.121	0.168
	High	3.544	0.101	2.847	3.578	0.045	1.248	-0.034	-0.152	0.084
Pepperoni	Low	5.873	0.059	1.005	6.076	0.073	1.201	-0.203	-0.302	-0.103
	Med	6.374	0.138	2.165	7.153	0.077	1.076	-0.779	-0.952	-0.605
	High	7.358	0.133	1.808	8.175	0.088	1.076	-0.817	-0.991	-0.643
Pepperoni Ind. lab[k]	Low	5.343	0.089	1.659	5.394	0.108	2.003	-0.051	-0.128	0.028
	Med	6.156	0.048	0.776	6.198	0.023	0.369	-0.042	-0.119	0.036
	High	6.883	0.053	0.770	6.871	0.038	0.557	0.012	-0.037	0.060
Cottage cheese	Low	5.323	0.129	2.423	5.217	0.098	1.878	0.106	-0.064	0.278
	Med	6.537	0.070	1.071	6.364	0.123	1.933	0.173	0.019	0.328
	High	6.975	0.042	0.602	7.096	0.094	1.325	-0.121	-0.239	0.002
Cottage cheese Ind. lab[k]	Low	4.512	0.066	1.472	4.493	0.087	1.939	0.019	-0.123	0.162
	Med	6.879	0.141	2.049	6.403	0.092	1.434	0.476	0.307	0.645
	High	7.959	0.017	0.208	7.729	0.098	1.262	0.230	0.114	0.347
Ready-to-bake pizza	Low	5.475	0.126	2.301	5.316	0.148	2.784	0.159	-0.046	0.364
	Med	6.533	0.110	1.684	6.431	0.118	1.835	0.102	-0.069	0.273
	High	7.835	0.356	4.544	7.798	0.343	4.399	0.037	0.006	0.068
Ready-to-bake pizza Ind. lab[k]	Low	2.242	0.097	4.323	2.200	0.063	2.878	0.042	-0.065	0.147
	Med	4.638	0.089	1.922	4.638	0.082	1.760	0.000	-0.090	0.091
	High	5.509	0.043	0.783	5.493	0.101	1.846	0.016	-0.137	0.168
Stainless steel[i]	Un	0.000	NA	NA	0.000	NA	NA	NA	NA	NA
	Low	2.223	0.174	7.827	2.078	0.244	11.74	0.145	-0.171	0.459
	Med	4.113	0.090	2.188	4.088	0.078	1.908	0.024	-0.101	0.151
	High	5.239	0.135	2.577	5.285	0.054	1.022	-0.046	-0.214	0.121
Stainless steel[i] Ind. lab[k]	Low	1.372	0.285	20.77	1.658	0.263	15.87	-0.286	-0.702	0.105
	Med	3.088	0.073	2.372	3.078	0.043	1.390	0.010	-0.094	0.116
	High	3.869	0.541	1.328	3.833	0.090	2.356	0.036	-0.028	0.101

[a]All matrixes are naturally contaminated unless specified with an uninoculated (Un) level.

[b]Mean of five replicate portions, plated in duplicate, after logarithmic transformation: Log_{10}[CFU/g + (0.1)f].

[c]Repeatability standard deviation.

[d]Relative standard deviation for repeatability.

[e]Mean difference between the candidate and reference methods.

[f]Confidence interval.

[g]95% Lower confidence limit for difference of means.

[h]95% Upper confidence limit for difference of means.

[i]Inoculating strains: Cold smoked salmon, *Lactococcus garvieae* (American Type Culture Collection (ATCC) 43921); cream pastry, *Lactococcus lactis* (ATCC 11454); herring, *Pediococcus pentosaceus* (ATCC 33316); mustard potato salad, *Lactobacillus plantarum* (ATCC 8014); chicken sausage (Independent Laboratory Study), *Lactobacillus casei* (ATCC 11578); stainless steel (Method Developer Study), *Lactobacillus fermentum* (National Collections of Industrial, Food and Marine Bacteria 6991); stainless steel (Independent Laboratory Study), kefir.

[j]Uninoculated matrix sample, 0 CFU/g Lactic acid bacteria.

[k]Matrix study conducted by the Independent Laboratory, Q Laboratories, Inc. (Cincinnati, OH).

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