



CERTIFICATION

AOAC Research Institute
***Performance Tested Methods*SM**

Certificate No.

071302

The AOAC Research Institute hereby certifies the method known as

MicroSnap Coliform & MicroSnap *E. coli*

manufactured by

Hygiena LLC

941 Avenida Acaso

Camarillo, CA 93012 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.

A handwritten signature in black ink, appearing to read "Bradley A. Stawick".

Bradley A. Stawick, AOAC Research Institute Senior Director

Issue Date

December 20, 2025

Expiration Date

December 31, 2026

AUTHORS ORIGINAL VALIDATION: Hygiena International MODIFICATION MAY 2021: Paul Meighan, Brandon Katz, and Delaram Nikoeei	SUBMITTING COMPANY Hygiena LLC 941 Avenida Acaso Camarillo, CA 93012 USA
---	--

METHOD NAME MicroSnap Coliform & MicroSnap <i>E. coli</i>	CATALOG NUMBERS Enrichment Device - MS1-CEC Detection Device - MS2- CEC (COLIFORM); MS2-EC (<i>E. coli</i>)
---	--

INDEPENDENT LABORATORY Leatherhead Food Research Randall's Road Leatherhead, Surrey KT22 7RY UK
--

APPLICABILITY OF METHOD Target organism – Coliforms and <i>E. coli</i> . Matrixes – Coliforms – AOAC 966.24: raw ground beef (50 g), ready-to-eat ham (50 g*), cooked chicken (50 g), raw chicken (50 g) Standard Methods for Examination of Dairy Products, Ch 7 – raw liquid milk (50 g) USDA BAM Ch 4 – raw cod (50 g), raw prawns (50 g), pre-packaged lettuce leaves (50 g), sandwiches (bacon, lettuce, tomato) (50 g*), and bottled water (mineral, still) <i>E. coli</i> – AOAC 966.24 raw ground beef (50 g), ready-to-eat ham (50 g*), cooked chicken (50 g), raw chicken (50 g), raw cod (50 g), raw prawns (50 g), pre-packaged lettuce leaves (50 g*), raw liquid milk (50 g), sandwich (Bacon, lettuce, tomato) (50 g) USDA BAM Ch 4 – bottled water (mineral, still) *Certified for enumeration only Performance claims – The method was shown to have a good correlation with the reference methods.	REFERENCE METHODS <i>Official Methods of Analysis</i> (2019), 21st Ed., 966.24, AOAC INTERNATIONAL, Rockville, MD (3) U.S. Food and Drug Administration Bacteriological Analytical Manual (FDA-BAM), Chapter 4 (4) <i>The Standard Methods for the Examination of Dairy Products</i> (SMEDP), Chapter 7, 17th edition, 2004, APHA (5) U.S. FDA Bacteriological Analytical Manual Ch. 4 (2017), Enumeration of <i>Escherichia coli</i> and the Coliform Bacteria (10)
--	---

ORIGINAL CERTIFICATION DATE July 12, 2013	CERTIFICATION RENEWAL RECORD Renewed through December 2026.
---	---

METHOD MODIFICATION RECORD <ol style="list-style-type: none">December 2017 Level 1May 2021 Level 2December 2023 Level 1December 2024 Level 1	SUMMARY OF MODIFICATION <ol style="list-style-type: none">Editorial changes.Incorporation of handheld device, EnSURE Touch™ Luminometer.Editorial changes.Editorial changes.
--	--

Under this AOAC <i>Performance Tested Methods</i> SM License Number, 071302 this method is distributed by: NONE	Under this AOAC <i>Performance Tested methods</i> SM License Number, 071302 this method is distributed as: NONE
---	---

PRINCIPLE OF THE METHOD (1)

The MicroSnap method consists of 2 separate devices used in sequence to achieve a result from the assay. The first device (Enrichment Device) grows the bacteria from the sample under investigation. The sample is added to this device as a 1 mL aliquot of either a liquid or a 10% food suspension. This device contains a proprietary nutrient growth media with inducers of beta-Galactosidase and beta-Glucuronidase. During the incubation at 37 ± 0.5°C the beta-Galactosidase and/or beta-Glucuronidase enzymes accumulate within the bacteria. Both enzymes become proportional to the number of bacteria in the starting inoculum at specific incubation times after the lag phase of the bacteria. These incubation times have been found to be 6 hours and 8 hours at 37 ± 0.5°C. Since the bacteria do not readily export these enzymes into the media, each bacterium expresses a similar concentration of enzyme per bacterial cell; this is true for both enzymes. The concentration of enzyme expressed using the inducers are consistent across the Coliform group and *E. coli*, although exceptions do exist.

At 6 hours of incubation, the dynamic range over which the test begins to function quantitatively begins at 100 CFU and upwards this is expressed as a proportional rise in the RLU measured in each sample in each luminometer. Longer incubation times push the lower level of detection downwards.

The second device is the Detection Device. There are 2 separate specific detection devices used, one for beta-Galactosidase detection and one for beta-Glucuronidase detection. These 2 devices can be used to verify the same enrichment device for either coliforms and/or *E. coli*. Each detection device contains a lysis reagent in the tube portion with ATP, beta-Galactosidase substrate or beta-Glucuronidase substrate and luciferase reagent in the bulb portion of the device. The substrate is manufactured to have the recognition part (or sugar in these cases) for the enzyme under test, linked via a cleavable bond to luciferin. On successful cleavage of the substrate the luciferin is released, which in the presence of luciferase and other factors emits light in relation to the amount of enzyme present in the growing culture. At the specific time point of 6 hours, the concentration of enzyme is directly related to the starting concentration of bacteria. This 6-hour quantification point is true for both coliforms and *E. coli*. The time point when all bacteria, independent of starting inoculum, are detected is 8 hours, hence even levels of less than 10 coliforms will have produced enough enzyme by 8 hours to be determined as positive in the assay.

DISCUSSION OF THE VALIDATION STUDY (1)

The MicroSnap Coliform and *E. coli* detection system is primarily designed to give a rapid and semi-quantitative assessment for *E. coli* and coliforms from food samples. The product is sold as a system for quantitation and detection at low to medium levels of both *E. coli* and coliforms. The quantification is designed to be an overall indicator of levels of bacteria in the samples being tested.

The MicroSnap coliform and *E. coli* are the first of a tranche of bioluminogenic assays designed to give the investigator the possibility to determine levels of contaminating organisms in 6 hours due to the extreme sensitivity that can be gained from these forms of assay. The unique nature of the assay producing light in relation to the enzyme concentration means the system can have the ability to detect low enzyme levels from low levels of bacteria that are actively growing in the sample under investigation.

The levels of quantification required can be thought of as traffic light type system for most investigators. The European Food Regulations (Commission Regulation EC No 2073/2005) of 15 November 2005 have limits set for most food for the measurement of both pathogens (*Listeria* and *Salmonella*) but also for indicator organisms, *E. coli*, Coliforms and Enterobacteriaceae. The regulations stipulate that certain levels need to be maintained for quality and safety. In regulation 2.1.6 governing minced meat, there are 3 levels that are mentioned <50cfu/g, 50 – 500cfu/g and greater than 500cfu/g. The numbers of replicates run and the number of each replicates that are allowed at each level tested is prescribed. If all 5 replicates are below 50cfu/g the meat is deemed excellent, if 2 of the 5 replicates are between 50 – 500cfu/g it is deemed adequate if any reps are above 500cfu/g it is deemed not fit. These levels indicate low, medium and high levels of contamination akin to a go, wait and stop. Hence, the use of MicroSnap and other systems these can be used to rapidly measure and track which level the sample best fits. The setting for these levels will be determined for each food by each investigator according to the regulations or deemed appropriate for each food by internal validation.

During the assessment of the AOAC official method, it was found that certain non-*E. coli* coliforms would not begin to grow in the first enrichment broth for the MPN (LST), which led to the conclusion that some bacteria are incapable of being picked up using the standard method. Both methods will never detect all bacteria being considered as potential targets. These exceptions could lead to both methods showing variation and non-significances.

Table 1. Inclusivity for Non-*E. coli* Coliforms at 6 and 8 hours incubation in the luminometers SS Plus and Pi102. Detection of approximately 10 – 100 CFU/mL using Coliform Detection Devices (1)

Organism	Source	Origin (if known)	6 hr Enrichment		8 hr enrichment	
			SS +	Pi-102	SS +	Pi-102
<i>Escherichia hermannii</i>	Wild Type	Minced Beef	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Enterobacter cloacae</i>	Surrey University E002	Water	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Enterobacter aerogenes</i> ^a	OXOID	ATCC 10006	NEGATIVE	NEGATIVE	POSITIVE	POSITIVE
<i>Enterobacter cloacae</i>	Surrey University E003	Rice	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Enterobacter cloacae</i>	Surrey University E004	Milk	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Klebsiella pneumoniae</i>	Hospital KP13	ESBL Urine	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Klebsiella oxytoca</i> ^b	Surrey University KO004	Food (unknown)	POSITIVE	NEGATIVE	POSITIVE	POSITIVE
<i>Citrobacter diversus</i>	Surrey University C0011	Food (unknown)	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Klebsiella pneumoniae</i>	HPA	ATCC 700603	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Klebsiella pneumoniae</i>	Hospital KP9	ESBL Faeces	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Citrobacter freundii</i>	Surrey University C0012	Salad	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Klebsiella pneumoniae</i>	HPA	NCTC 13438	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Klebsiella pneumoniae</i>	HPA	NCTC 13465	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Klebsiella pneumoniae</i>	HPA	NCTC 13443	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Klebsiella pneumoniae</i>	HPA	NCTC 13439	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Escherichia fergusonii</i>	HPA	NCTC 12128	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Klebsiella pneumoniae</i>	Surrey University KO015	Food (surface)	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Escherichia hermannii</i>	HPA	173	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Enterococcus sakazakii</i>	Surrey University E0023	Baby Milk	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Enterococcus aerogenes</i>	Oxoid	ATCC 13048	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Citrobacter freundii</i> ^c	Oxoid	ATCC 8090	NEGATIVE	NEGATIVE	POSITIVE	POSITIVE
<i>Enterococcus sakazakii</i>	HPA	NCTC 8155	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> O157 (NT)	OXOID	ATCC 12900	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Klebsiella oxytoca</i>	Surrey University KO031	Salad	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>Enterococcus cloacae</i>	Surrey University E0017	Salad	POSITIVE	POSITIVE	POSITIVE	POSITIVE

^aPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 1,000 CFU/mL.

^bPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 410 CFU/mL.

^cPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 720 CFU/mL.

Table 2. Inclusivity for E. coli Coliforms at 6 and 8 hours incubation in the luminometers SS Plus and Pi102. Detection of approximately 10 – 100 CFU/mL using Coliform Detection Devices (1)

Organism	Source	Origin (if known)	6 hr Enrichment		8 hr enrichment	
			SS Plus	Pi102	SS Plus	Pi102
<i>E. coli</i> 63	Aberdeen University	Clinical isolate	POSITIVE	NEGATIVE	POSITIVE	POSITIVE
<i>E. coli</i> 64 ^a	Aberdeen University	Clinical Isolate	NEGATIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 67 ^b	Aberdeen University	Clinical Isolate	POSITIVE	NEGATIVE	POSITIVE	POSITIVE
<i>E. coli</i> 68	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> (EC 10)	Hospital	ESBL Urine	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 50	Aberdeen University	Clinical isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 52 ^c	Aberdeen University	Clinical Isolate	POSITIVE	NEGATIVE	POSITIVE	POSITIVE
<i>E. coli</i> 54	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 53	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 48	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 32	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 21	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i>	OXOID	ATCC 8739	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i>	OXOID	ATCC 25922	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0018	University Surrey	Unknown	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0019 ^d	University Surrey	Food (unknown)	NEGATIVE	NEGATIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0023 ^e	University Surrey	Food (unknown)	NEGATIVE	NEGATIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0026	University Surrey	Food (unknown)	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0025 ^f	University Surrey	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	POSITIVE
<i>E. coli</i> ^g	OXOID	ATCC 13216	NEGATIVE	NEGATIVE	NEGATIVE	POSITIVE
<i>E. coli</i> E0033	University Surrey	Food (unknown)	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> ^h	OXOID	ATCC 35218	NEGATIVE	NEGATIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0039	University Surrey	Food (unknown)	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0034	University Surrey	Food (unknown)	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i>	OXOID	ATCC 11775	POSITIVE	POSITIVE	POSITIVE	POSITIVE

^aPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 800 CFU/mL.

^bPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 210 CFU/mL.

^cPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 125 CFU/mL.

^dPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 1,000 CFU/mL.

^ePositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 110 CFU/mL.

^fPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 770 CFU/mL.

^gPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 100 CFU/mL.

^hPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 100 CFU/mL.

Table 3. Inclusivity for *E. coli* at 6 and 8 hours incubation in SS Plus and Pi102. Detection of approximately 10 – 100 CFU/mL using *E. coli* Detection Devices (1)

Organism	Source	Origin	6 hr Enrichment		8 hr enrichment	
			SS Plus	Pi102	SS Plus	Pi102
<i>E. coli</i> 63	Aberdeen University	Clinical isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 64 ^a	Aberdeen University	Clinical Isolate	NEGATIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 67	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 68	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> (EC 10) ^b	Hospital	ESBL Urine	NEGATIVE	NEGATIVE	POSITIVE	POSITIVE
<i>E. coli</i> 50	Aberdeen University	Clinical isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 52	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 54	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 53	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 48	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 32	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> 21	Aberdeen University	Clinical Isolate	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i>	OXOID	ATCC 8739	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> ^c	OXOID	ATCC 25922	NEGATIVE	NEGATIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0018	University Surrey	Food (unknown)	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0019 ^d	University Surrey	Food (unknown)	NEGATIVE	NEGATIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0023 ^e	University Surrey	Food (unknown)	NEGATIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0026	University Surrey	Food (unknown)	POSITIVE	NEGATIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0025 ^f	University Surrey	Food (unknown)	NEGATIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i>	OXOID	ATCC 13216	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0033	University Surrey	Food (unknown)	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> ^g	OXOID	ATCC 35218	NEGATIVE	NEGATIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0039	University Surrey	Food (unknown)	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i> E0034	University Surrey	Food (unknown)	POSITIVE	POSITIVE	POSITIVE	POSITIVE
<i>E. coli</i>	OXOID	ATCC 11775	POSITIVE	POSITIVE	POSITIVE	POSITIVE

^aPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 800 CFU/mL.

^bPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 100 CFU/mL.

^cPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 100 CFU/mL.

^dPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 1,000 CFU/mL.

^ePositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 110 CFU/mL.

^fPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 770 CFU/mL.

^gPositive at CFU/mL between 100 – 1,000 at 6 h. Lowest level detected at 6 h was 100 CFU/mL.

Table 4. Exclusivity for non-Coliforms at 6 and 8 hours incubation in the luminometers SS Plus and Pi102. Detection of approximately 10⁸ CFU/mL using Coliform and E. coli Detection Devices (1)

Organism	Source	Origin	Micro-Snap Coliform		Micro-Snap E. coli	
			SS+	Pi 102	SS+	Pi 102
MRSA 1	Surrey Hospital	Clinical	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>S. aureus</i> 6538	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Salmonella</i> Virchow	Campden CRA1011	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Salmonella</i> Seftenberg	Campden CRA9281	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Salmonella</i> Infantis	Campden CRA1038	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Salmonella</i> Nottingham	Campden CRA1004	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Serratia flexneri</i>	Campden CRA325	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Serratia boydii</i>	Campden CRA324	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Serratia marcescens</i>	Campden CRA1521	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Serratia proteomaculans</i>	Campden CRA16483	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Serratia liquifaciens</i>	Campden CRA1491	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Edwardsiella tarda</i>	Campden CRA8392	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Providencia rettgeri</i>	Campden CRA8386	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Yersinia enterocolitica</i>	Campden CRA4103	Food (unknown)	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>E. faecalis</i> ATCC 10100	University Surrey	Water	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Proteus vulgaris</i>	Campden CRA1581	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Salmonella</i> Jena NCTC 5765	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Salmonella</i> Dublin NCTC 9676	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>S. Typhimurium</i> 14028	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Candida albicans</i> 10231	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>P. aeruginosa</i> 10145	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Bacillus subtilis</i> 6633	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>L. monocytogenes</i> NCR 5214	University Surrey	Salad	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>L. innocua</i> ATCC 33090	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>Bacillus cereus</i> ATCC 11778	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>P. mirabilis</i> ATCC 43071	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>B. cepacia</i> ATCC 25608	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>S. Enteritidis</i> ATCC 13076	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
<i>P. fluorescens</i> ATCC 13525	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE

<i>Listeria innocua</i> ATCC 33090	OXOID	Unknown	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
------------------------------------	-------	---------	----------	----------	----------	----------

Table 5. Enumeration of Coliforms using Micro-Snap Coliform Detection Device vs. Reference Method – Pi102 Luminometer (1)

Run	Target Level ^a	FOOD	Ref. mean ^b	Ref. s _r ^c	Micro-Snap mean	Micro-Snap s _r	Mean difference	p-value ^d	95% LCL ^e	95% UCL ^f
1	10K	BEEF	4.08	0.09	4.30	0.15	-0.21	0.09	-0.48	-0.06
1	1K	Naturally	3.23	0.15	3.19	0.26	-0.08	0.57	-0.29	0.12
1	100	Contaminated	2.97	0.21	2.70	0.06	0.18	0.07	-0.02	0.38
2	10K	BEEF	4.78	0.27	4.91	0.23	0.13	0.96	-0.44	0.46
2	1K	<i>E. cloacae</i> (E0002)	3.92	0.16	4.33	0.27	-0.41	0.08	-0.89	-0.07
2	100	<i>E. coli</i> ATCC 8739	2.92	0.31	3.45	0.60	-0.44	0.10	-1.02	0.14
3	10K	BEEF ^g	5.04	0.00	5.12	0.11	-0.08	0.30	-0.25	0.10
3	1K	Naturally	3.66	0.00	3.73	0.10	-0.07	0.31	-0.24	0.10
3	100	Contaminated	2.38	0.00	2.59	0.18	-0.21	0.13	-0.49	0.09
1	10K	BLT	4.72	0.11	4.99	0.07	-0.27	0.05	0.03	0.48
1	1K	<i>K. pneumoniae</i> ATCC 700603	3.63	0.34	3.80	0.12	-0.17	0.20	-0.49	0.14
1	100	<i>E. coli</i> NCTC 13216	2.70	0.33	2.71	0.07	-0.01	0.96	-0.45	0.43
1	10K	COD	4.91	0.31	4.23	0.11	0.68	0.00	0.43	0.93
1	1K	Naturally	4.59	0.20	4.46	0.08	0.12	0.14	-0.06	0.31
1	100	Contaminated	3.37	0.22	3.87	0.40	-0.50	0.13	-1.29	0.25
2	10K	COD	3.74	0.27	3.83	0.16	-0.08	0.25	-0.26	0.09
2	1K	Naturally	2.82	0.34	3.20	0.34	-0.29	0.23	-0.86	0.28
2	100	Contaminated	1.89	0.19	2.38	0.11	-0.49	0.00	-0.71	-0.27
1	10K	COOKED CHICKEN	3.65	0.25	4.39	0.13	-0.74	0.00	-1.00	-0.48
1	1K	<i>E. aerogenes</i> ATCC 10006	3.06	0.07	3.03	0.03	0.03	0.24	-0.03	0.08
1	100	<i>E. coli</i> ATCC 25922	1.96	0.05	1.69	0.07	0.26	0.07	0.18	0.34
1	10K	LETTUCE	4.68	0.29	4.71	0.25	-0.04	0.57	-0.20	0.13
1	1K	<i>K. pneumoniae</i> (ESBL 13)	3.92	0.22	4.71	0.29	-0.79	0.06	-0.11	1.62
1	100	<i>E. coli</i> (EC 64)	3.04	0.00	2.97	0.10	0.07	0.16	-0.04	0.19
1	10k	MILK	4.82	0.03	4.88	0.07	-0.06	0.14	-0.15	0.03
1	1k	<i>K. oxytoca</i> (K0005)	3.82	0.03	4.18	0.69	-0.35	0.31	-1.19	0.49
1	100	<i>E. coli</i> (EC54)	2.82	0.03	2.98	0.19	-0.15	0.14	-0.38	0.08
2	10k	MILK	4.59	0.04	5.09	0.72	-0.49	0.00	-0.59	-0.39
2	1k	<i>K. oxytoca</i> (K0005)	3.61	0.09	5.03	0.06	-1.49	0.00	-1.60	-1.39
2	100	<i>E. coli</i> (EC54)	2.62	0.08	2.67	0.03	-0.06	0.23	-0.19	0.06
3	1k	MILK ^g	3.86	0.00	4.09	0.28	-0.23	0.14	-0.50	0.12
3	100	<i>K. oxytoca</i> (K0005)	2.90	0.00	2.20	0.05	0.70	0.00	0.63	0.78
3	10	<i>E. coli</i> (EC54)	2.06	0.00	1.77	0.21	0.29	0.05	0.01	0.47
1	10k	RAW CHICKEN	4.14	0.14	3.98	0.15	0.16	0.06	-0.01	0.33
1	1k	Naturally	3.04	0.00	2.94	0.12	0.09	0.14	-0.05	0.24
1	100	Contaminated	2.37	0.35	2.16	0.17	0.21	0.06	-0.02	0.43
2	10k	RAW CHICKEN	4.06	0.18	4.25	0.19	-0.19	0.05	-0.36	-0.02
2	1k	Naturally	2.97	0.17	2.82	0.38	0.15	0.24	-0.15	0.43
2	100	Contaminated	2.29	0.35	2.15	0.19	0.14	0.15	-0.32	0.25
1	10k	RTE HAM	4.50	0.13	4.12	0.02	0.38	0.07	0.22	0.50
1	1k	<i>C. diversus</i> (C0011)	3.34	0.07	3.31	0.07	0.03	0.50	-0.09	0.16
1	100	<i>E. coli</i> (EC 67)	2.59	0.39	2.70	0.26	-0.11	0.44	-0.46	0.24
1	10k	PRAWN	3.61	0.13	3.47	0.23	0.13	0.25	-0.14	0.40
1	1k	Naturally	2.61	0.13	2.57	0.27	0.05	0.79	-0.40	0.49
1	100	Contaminated	1.74	0.20	1.30	0.09	0.44	0.05	0.13	0.75
1	1000	MINERAL	3.29	0.14	3.33	0.35	-0.04	0.75	-0.35	0.28
1	100	<i>C. freundii</i> (C0012)	2.31	0.09	2.17	0.61	0.14	0.57	-0.50	0.78
1	10	<i>E. coli</i> (EC 19)	1.27	0.13	1.53	0.39	-0.26	0.30	-0.89	0.36

^aTarget levels in cfu/gram^bMean result for the reference method relevant to each food type^cRepeatability standard deviation^dP-value for a 2-tail unmatched t-test, p-value <0.05 indicates significance at the 95% confidence level^e95% Lower confidence limit for difference of means^f95% Upper confidence limit for difference of means^gTest conducted at the independent laboratory

Table 6. Enumeration of Coliforms using Micro-Snap Coliform Detection Device vs. Reference Method – EnSURE Luminometer (1)

Run	Target Level ^a	FOOD	Ref. mean ^b	Ref. s _r ^c	Micro-Snap mean	Micro-Snap s _r	Mean difference	p-value ^d	95% LCL ^e	95% UCL ^f
1	10K	BEEF	4.08	0.09	4.23	0.10	-0.15	0.07	-0.31	0.02
1	1K	Naturally	3.23	0.15	2.97	0.31	0.30	0.11	-0.12	0.49
1	100	Contaminated	2.97	0.21	2.46	0.12	0.35	0.12	-0.23	0.74
2	10K	BEEF	4.78	0.27	4.56	0.18	0.26	0.13	-0.12	0.45
2	1K	<i>E. cloacae</i> (E0002)	3.92	0.16	4.23	0.23	-0.26	0.06	-0.51	0.03
2	100	<i>E. coli</i> ATCC 8739	2.92	0.31	3.45	0.26	-0.46	0.18	-0.38	0.61
3	10K	BEEF ^g	5.04	0.00	4.94	0.11	0.10	0.21	-0.09	0.30
3	1K	Naturally	3.66	0.00	3.32	0.12	0.34	0.01	0.13	0.54
3	100	Contaminated	2.38	0.00	2.08	0.21	0.20	0.11	-0.07	0.47
1	10K	BLT	4.72	0.11	4.27	0.06	0.46	0.05	-0.35	0.58
1	1K	<i>K. pneumoniae</i> ATCC 700603	3.63	0.34	3.38	0.38	0.03	0.86	-0.48	0.48
1	100	<i>E. coli</i> NCTC 13216	2.70	0.33	2.40	0.04	0.30	0.12	-0.13	0.43
1	10K	COD	4.91	0.31	4.55	0.18	0.33	0.06	0.03	0.43
1	1K	Naturally	4.59	0.20	4.79	0.25	-0.20	0.05	-0.37	-0.02
1	100	Contaminated	3.37	0.22	3.80	0.03	-0.32	0.10	-0.48	-0.15
2	10K	COD	3.74	0.27	3.94	0.25	-0.20	0.11	-0.47	0.08
2	1K	Naturally	2.82	0.34	3.13	0.17	-0.14	0.37	-0.51	0.25
2	100	Contaminated	1.89	0.19	2.11	0.26	-0.28	0.09	-0.48	-0.18
1	10K	COOKED CHICKEN	3.65	0.25	3.34	0.08	0.16	0.13	-0.07	0.38
1	1K	<i>E. aerogenes</i> ATCC 10006	3.06	0.07	3.00	0.06	-0.14	0.15	-0.65	0.15
1	100	<i>E. coli</i> ATCC 25922	1.96	0.05	1.78	0.21	0.13	0.38	-0.13	0.27
1	10K	LETTUCE	4.68	0.29	4.24	0.48	0.49	0.12	-0.78	0.20
1	1K	<i>K. pneumoniae</i> (ESBL 13)	3.92	0.22	3.95	0.34	-0.12	0.43	-0.52	0.27
1	100	<i>E. coli</i> (EC 64)	3.04	0.00	3.09	0.11	-0.13	0.18	-0.36	0.09
1	10k	MILK	4.82	0.03	4.63	0.08	0.20	0.05	0.07	0.32
1	1k	<i>K. oxytoca</i> (K0005)	3.82	0.03	3.94	0.50	-0.11	0.63	-0.50	0.49
1	100	<i>E. coli</i> (EC54)	2.82	0.03	3.11	0.24	-0.29	0.05	-0.56	0.01
2	10k	MILK	4.59	0.04	4.84	0.26	-0.24	0.24	-0.72	0.24
2	1k	<i>K. oxytoca</i> (K0005)	3.61	0.09	4.03	0.10	-0.31	0.05	-0.50	0.01
2	100	<i>E. coli</i> (EC54)	2.62	0.08	3.12	0.12	-0.51	0.00	-0.56	-0.30
3	1k	MILK ^g	3.86	0.00	2.57	0.09	1.29	0.00	1.13	1.46
3	100	<i>K. oxytoca</i> (K0005)	2.90	0.00	1.79	0.07	1.11	0.00	0.99	1.24
3	10	<i>E. coli</i> (EC54)	2.06	0.00	2.09	0.06	-0.02	0.56	-0.13	0.09
1	10k	RAW CHICKEN	4.14	0.14	4.43	0.25	-0.24	0.12	-0.50	0.10
1	1k	Naturally	3.04	0.00	3.98	0.25	0.78	0.03	-0.96	-0.60
1	100	Contaminated	2.37	0.35	2.07	0.16	0.22	0.08	-0.04	0.47
2	10k	RAW CHICKEN	4.06	0.18	4.54	0.51	-0.49	0.16	-0.28	0.30
2	1k	Naturally	2.97	0.17	3.40	0.55	-0.43	0.07	-0.41	0.05
2	100	Contaminated	2.29	0.35	2.30	0.28	-0.11	0.63	-0.68	0.47
1	10k	RTE HAM	4.50	0.13	4.78	0.13	-0.20	0.14	-0.50	0.10
1	1k	<i>C. diversus</i> (C0011)	3.34	0.07	3.67	0.26	-0.31	0.09	-0.48	0.07
1	100	<i>E. coli</i> (EC 67)	2.59	0.39	2.44	0.42	0.06	0.73	-0.41	0.50
1	10k	PRAWN	3.61	0.13	3.53	0.40	0.07	0.76	-0.50	0.60
1	1k	Naturally	2.61	0.13	2.95	0.34	-0.34	0.15	-0.49	0.18
1	100	Contaminated	1.74	0.20	1.61	0.12	0.09	0.40	-0.18	0.37
1	1000	MINERAL	3.29	0.14	3.20	0.40	0.09	0.52	-0.28	0.46
1	100	<i>C. freundii</i> (C0012)	2.31	0.09	1.90	0.47	0.35	0.21	-0.28	0.48
1	10	<i>E. coli</i> (EC 19)	1.27	0.13	0.90	0.21	0.37	0.06	-0.12	0.47

^aTarget levels in cfu/gram^bMean result for the reference method relevant to each food type^cRepeatability standard deviation^dP-value for a 2-tail unmatched t-test, p-value <0.05 indicates significance at the 95% confidence level^e95% Lower confidence limit for difference of means^f95% Upper confidence limit for difference of means^gTest conducted at the independent laboratory

Table 7. Enumeration of Coliforms using Micro-Snap Coliform Detection Device vs. Reference Method – SS Plus Luminometer (1)

Run	Target Level ^a	FOOD	Ref. mean ^b	Ref. s _r ^c	Micro-Snap mean	Micro-Snap s _r	Mean difference	p-value ^d	95% LCL ^e	95% UCL ^f
1	10K	BEEF	4.08	0.09	4.17	0.28	-0.09	0.45	-0.47	-0.11
1	1K	Naturally	3.23	0.15	2.90	0.55	0.33	0.32	-0.46	0.50
1	100	Contaminated	2.97	0.21	2.03	0.25	0.85	0.00	0.49	1.21
2	10K	BEEF	4.78	0.27	4.71	0.20	0.12	0.53	-0.36	0.51
2	1K	<i>E. cloacae</i> (E0002)	3.92	0.16	4.13	0.33	-0.22	0.33	-0.47	0.34
2	100	<i>E. coli</i> ATCC 8739	2.92	0.31	3.61	0.32	-0.62	0.00	-0.75	-0.49
3	10K	BEEF ^g	5.04	0.00	5.07	0.18	-0.03	0.85	-0.39	0.34
3	1K	Naturally	3.66	0.00	3.40	0.13	0.26	0.05	0.03	0.51
3	100	Contaminated	2.38	0.00	2.48	0.10	-0.11	0.22	-0.32	0.10
1	10K	BLT	4.72	0.11	4.62	0.10	0.11	0.08	-0.02	0.25
1	1K	<i>K. pneumoniae</i> ATCC 700603	3.63	0.34	3.96	0.10	-0.18	0.12	-0.44	0.07
1	100	<i>E. coli</i> NCTC 13216	2.70	0.33	2.49	0.33	0.22	0.24	-0.22	0.67
1	10K	COD	4.91	0.31	4.45	0.17	0.46	0.04	0.04	0.87
1	1K	Naturally	4.59	0.20	4.90	0.21	-0.32	0.06	-0.65	0.02
1	100	Contaminated	3.37	0.22	3.90	0.20	-0.53	0.08	-1.17	0.11
2	10K	COD	3.74	0.27	4.13	0.20	-0.29	0.12	-0.50	0.11
2	1K	Naturally	2.82	0.34	3.48	0.41	-0.26	0.16	-0.61	0.16
2	100	Contaminated	1.89	0.19	2.14	0.12	-0.25	0.07	-0.48	0.39
1	10K	COOKED CHICKEN	3.65	0.25	3.17	0.07	0.42	0.04	0.17	0.86
1	1K	<i>E. aerogenes</i> ATCC 10006	3.06	0.07	2.96	0.05	0.10	0.06	-0.01	0.19
1	100	<i>E. coli</i> ATCC 25922	1.96	0.05	1.76	0.07	0.09	0.19	-0.07	0.26
1	10K	LETTUCE	4.68	0.29	4.77	0.44	-0.04	0.52	-0.49	0.47
1	1K	<i>K. pneumoniae</i> (ESBL 13)	3.92	0.22	4.27	0.59	-0.45	0.22	-0.32	0.42
1	100	<i>E. coli</i> (EC 64)	3.04	0.00	2.81	0.17	0.16	0.05	-0.01	0.32
1	10k	MILK	4.82	0.03	4.17	0.09	0.65	0.00	0.52	0.79
1	1k	<i>K. oxytoca</i> (K0005)	3.82	0.03	3.58	0.38	0.25	0.22	-0.22	0.41
1	100	<i>E. coli</i> (EC54)	2.82	0.03	2.76	0.13	0.06	0.44	-0.15	0.28
2	10k	MILK	4.59	0.04	4.53	0.16	0.06	0.50	-0.16	0.28
2	1k	<i>K. oxytoca</i> (K0005)	3.61	0.09	3.61	0.16	-0.00	0.90	-0.09	-0.09
2	100	<i>E. coli</i> (EC54)	2.62	0.08	2.36	0.36	0.26	0.17	-0.18	0.69
3	1k	MILK ^g	3.86	0.00	2.75	0.10	1.12	0.00	0.90	1.33
3	100	<i>K. oxytoca</i> (K0005)	2.90	0.00	2.50	0.04	0.40	0.05	-0.12	0.49
3	10	<i>E. coli</i> (EC54)	2.06	0.00	2.63	0.03	-0.58	0.00	-0.63	-0.52
1	10k	RAW CHICKEN	4.14	0.14	4.45	0.17	-0.31	0.09	-0.51	0.09
1	1k	Naturally	3.04	0.00	3.57	0.40	-0.41	0.38	-0.54	0.70
1	100	Contaminated	2.37	0.35	2.90	0.11	-0.62	0.05	-0.10	1.21
2	10k	RAW CHICKEN	4.06	0.18	4.14	0.36	-0.08	0.81	-0.67	0.51
2	1k	Naturally	2.97	0.17	2.79	0.39	0.17	0.50	-0.42	0.43
2	100	Contaminated	2.29	0.35	2.23	0.13	0.05	0.76	-0.43	0.50
1	10k	RTE HAM	4.50	0.13	4.24	0.16	0.32	0.09	-0.08	0.52
1	1k	<i>C. diversus</i> (C0011)	3.34	0.07	3.65	0.12	-0.33	0.06	-0.04	0.58
1	100	<i>E. coli</i> (EC 67)	2.59	0.39	2.78	0.26	-0.28	0.15	-0.42	0.16
1	10k	PRAWN	3.61	0.13	3.73	0.24	-0.13	0.69	-0.49	0.61
1	1k	Naturally	2.61	0.13	2.69	0.11	-0.03	0.45	-0.50	0.56
1	100	Contaminated	1.74	0.20	2.11	0.10	-0.27	0.21	-0.45	0.21
1	1000	MINERAL	3.29	0.14	3.27	0.32	0.01	0.90	-0.35	0.36
1	100	<i>C. freundii</i> (C0012)	2.31	0.09	1.83	0.37	0.45	0.13	-0.19	0.53
1	10	<i>E. coli</i> (EC 19)	1.27	0.13	1.21	0.10	0.06	0.51	-0.19	0.33

^aTarget levels in cfu/gram^bMean result for the reference method relevant to each food type^cRepeatability standard deviation^dP-value for a 2-tail unmatched t-test, p-value <0.05 indicates significance at the 95% confidence level^e95% Lower confidence limit for difference of means^f95% Upper confidence limit for difference of means^gTest conducted at the independent laboratory

Table 8. Enumeration of <i>E. coli</i> using Micro-Snap <i>E. coli</i> Detection Device vs. Reference Method – Pi 102 Luminometer (1)										
Run	Target Level ^a	FOOD	Ref. mean ^b	Ref. s _r ^c	Micro-Snap mean	Micro-Snap s _r	Mean difference	p-value ^d	95% LCL ^e	95% UCL ^f
1	10K	BEEF	3.71	0.24	3.90	0.32	-0.19	0.45	-0.50	0.44
1	1K	Naturally	2.78	0.15	3.10	0.14	-0.32	0.05	-0.01	0.64
1	100	Contaminated	2.61	0.25	2.33	0.55	0.28	0.22	-0.26	0.48
2	10K	BEEF	4.90	0.15	5.05	0.14	-0.15	0.35	-0.54	0.25
2	1K	<i>E. cloacae</i> (E0002)	3.62	0.42	3.85	0.24	-0.23	0.40	-0.41	0.44
2	100	<i>E. coli</i> ATCC 8739	2.63	0.27	2.83	0.12	-0.21	0.26	-0.53	0.21
3	10K	BEEF ^g	4.66	0.00	4.64	0.11	0.03	0.71	-0.15	0.20
3	1K	Naturally	3.58	0.00	3.12	0.24	0.46	0.12	-0.60	0.28
3	100	Contaminated	0.79	0.00	0.87	0.48	-0.07	0.80	-0.46	0.49
1	10K	BLT	4.18	0.14	3.97	0.10	0.20	0.06	-0.02	0.42
1	1K	<i>K. pneumoniae</i> ATCC 700603	3.51	0.42	3.13	0.10	0.37	0.14	-0.20	0.94
1	100	<i>E. coli</i> NCTC 13216	2.11	0.20	2.31	0.19	-0.19	0.33	-0.66	0.28
1	10K	COD	4.50	0.31	4.47	0.05	0.02	0.87	-0.32	0.36
1	1K	Naturally	3.85	0.19	3.79	0.19	0.06	0.70	-0.32	0.43
1	100	Contaminated	2.70	0.25	2.67	0.16	0.02	0.81	-0.18	0.22
2	10K	COD	3.42	0.31	3.58	0.06	-0.16	0.38	-0.60	0.29
2	1K	Naturally	2.84	0.47	2.70	0.28	0.14	0.34	-0.23	0.51
2	100	Contaminated	1.94	0.22	2.42	0.39	-0.48	0.07	-0.07	0.61
1	10K	COOKED CHICKEN	3.66	0.26	4.25	0.33	-0.58	0.04	-1.13	-0.04
1	1K	<i>E. aerogenes</i> ATCC 10006	3.04	0.49	2.93	0.35	0.11	0.61	-0.46	0.69
1	100	<i>E. coli</i> ATCC 25922	2.04	0.09	1.69	0.36	0.35	0.18	-0.24	0.52
1	10K	LETTUCE	4.03	0.24	4.11	0.07	-0.08	0.48	-0.36	0.20
1	1K	<i>K. pneumoniae</i> (ESBL 13)	2.93	0.09	3.15	0.34	-0.22	0.35	-0.78	0.35
1	100	<i>E. coli</i> (EC 64)	2.13	0.55	2.10	0.52	-0.50	0.01	-0.77	-0.24
1	10k	MILK	4.47	0.31	4.97	0.04	-0.50	0.02	-0.82	-0.14
1	1k	<i>K. oxytoca</i> (K0005)	3.85	0.19	3.80	0.19	0.06	0.70	-0.32	0.43
1	100	<i>E. coli</i> (EC54)	2.70	0.25	2.68	0.16	0.02	0.81	-0.18	0.22
2	10k	MILK	4.40	0.18	4.28	0.15	0.11	0.42	-0.24	0.47
2	1k	<i>K. oxytoca</i> (K0005)	3.31	0.13	3.17	0.16	0.15	0.18	-0.11	0.42
2	100	<i>E. coli</i> (EC54)	2.34	0.20	2.29	0.19	0.05	0.65	-0.21	0.30
3	1k	MILK ^g	4.04	0.00	4.21	0.31	-0.08	0.70	-0.60	0.44
3	100	<i>K. oxytoca</i> (K0005)	1.46	0.00	1.78	0.14	-0.29	0.01	-0.47	-0.12
3	10	<i>E. coli</i> (EC54)	1.63	0.00	1.60	0.17	-0.05	0.57	-0.26	0.16
1	10k	RAW CHICKEN	3.69	0.31	3.47	0.05	0.21	0.20	-0.17	0.59
1	1k	Naturally	2.43	0.16	2.30	0.19	0.14	0.38	-0.24	0.51
1	100	Contaminated	1.66	0.14	1.12	0.16	0.54	0.03	0.10	0.86
2	10k	RAW CHICKEN	3.07	0.13	2.87	0.32	0.20	0.37	-0.34	0.51
2	1k	Naturally	2.44	0.01	2.16	0.10	0.28	0.01	0.11	0.44
2	100	Contaminated	1.45	0.10	1.57	0.09	-0.12	0.16	-0.32	0.07
1	10k	RTE HAM	3.61	0.33	3.61	0.10	0.01	0.98	-0.47	0.48
1	1k	<i>C. diversus</i> (C0011)	3.22	0.33	3.51	0.40	-0.29	0.27	-0.50	0.33
1	100	<i>E. coli</i> (EC 67)	2.06	0.20	1.60	0.09	0.20	0.05	-0.48	0.41
1	10k	PRAWN	3.09	0.24	2.97	0.69	0.12	0.77	-0.48	0.51
1	1k	Naturally	1.98	0.23	1.21	0.64	0.77	0.05	-0.03	1.52
1	100	Contaminated	1.05	0.23	1.10	0.32	-0.04	0.92	-0.53	0.54
1	1000	MINERAL	3.71	0.24	3.90	0.32	-0.19	0.45	-0.50	0.44
1	100	<i>C. freundii</i> (C0012)	2.78	0.15	3.10	0.14	-0.32	0.05	-0.01	0.64
1	10	<i>E. coli</i> (EC 19)	2.61	0.25	2.33	0.55	0.28	0.22	-0.26	0.48

^aTarget levels in cfu/gram

^bMean result for the reference method relevant to each food type

^cRepeatability standard deviation

^dP-value for a 2-tail unmatched t-test, p-value <0.05 indicates significance at the 95% confidence level

^e95% Lower confidence limit for difference of means

^f95% Upper confidence limit for difference of means

^gTest conducted at the independent laboratory

Table 9. Enumeration of *E. coli* using Micro-Snap *E. coli* Detection Device vs. Reference Method – EnSURE Luminometer (1)

Run	Target Level ^a	FOOD	Ref. mean ^b	Ref. s _r ^c	Micro-Snap mean	Micro-Snap s _r	Mean difference	p-value ^d	95% LCL ^e	95% UCL ^f
1	10K	BEEF	3.71	0.24	3.89	0.34	-0.17	0.58	-0.44	0.43
1	1K	Naturally	2.78	0.15	2.76	0.17	-0.06	0.72	-0.51	0.39
1	100	Contaminated	2.61	0.25	2.22	0.13	0.39	0.09	-0.68	0.11
2	10K	BEEF	4.90	0.15	4.55	0.30	0.35	0.18	-0.25	0.95
2	1K	<i>E. cloacae</i> (E0002)	3.62	0.42	4.04	0.20	-0.42	0.05	-0.57	0.08
2	100	<i>E. coli</i> ATCC 8739	2.63	0.27	3.25	0.10	-0.62	0.00	-0.86	-0.38
3	10K	BEEF ^g	4.66	0.00	4.24	0.07	0.42	0.05	-0.09	0.54
3	1K	Naturally	3.58	0.00	2.80	0.24	0.78	0.00	0.42	1.14
3	100	Contaminated	0.79	0.00	2.34	0.07	-1.55	0.00	-1.66	-1.43
1	10K	BLT	4.18	0.14	3.83	0.31	0.34	0.09	-0.07	0.77
1	1K	<i>K. pneumoniae</i> ATCC 700603	3.51	0.42	3.06	0.30	0.45	0.17	-0.30	0.68
1	100	<i>E. coli</i> NCTC 13216	2.11	0.20	1.99	0.09	0.12	0.37	-0.21	0.45
1	10K	COD	4.50	0.31	4.34	0.08	0.16	0.26	-0.17	0.49
1	1K	Naturally	3.85	0.19	4.19	0.21	-0.33	0.09	-0.73	0.08
1	100	Contaminated	2.70	0.25	2.94	0.19	-0.24	0.04	-0.48	-0.01
2	10K	COD	3.42	0.31	3.51	0.05	-0.09	0.61	-0.54	0.36
2	1K	Naturally	2.84	0.47	2.55	0.20	0.29	0.11	-0.11	0.60
2	100	Contaminated	1.94	0.22	2.34	0.19	-0.40	0.07	-0.05	0.61
1	10K	COOKED CHICKEN	3.66	0.26	3.32	0.08	0.28	0.13	-0.13	0.69
1	1K	<i>E. aerogenes</i> ATCC 10006	3.04	0.49	2.33	0.06	0.07	0.74	-0.45	0.58
1	100	<i>E. coli</i> ATCC 25922	2.04	0.09	1.60	0.21	0.07	0.38	-0.13	0.27
1	10K	LETTUCE	4.03	0.24	4.35	0.44	-0.39	0.06	-0.51	0.03
1	1K	<i>K. pneumoniae</i> (ESBL 13)	2.93	0.09	3.01	0.23	-0.06	0.67	-0.45	0.32
1	100	<i>E. coli</i> (EC 64)	2.13	0.55	2.54	0.28	-0.41	0.30	-0.68	0.48
1	10k	MILK	4.47	0.31	4.34	0.11	0.16	0.26	-0.17	0.49
1	1k	<i>K. oxytoca</i> (K0005)	3.85	0.19	4.19	0.30	-0.33	0.09	-0.73	0.08
1	100	<i>E. coli</i> (EC54)	2.70	0.25	2.94	0.27	-0.23	0.05	-0.48	0.01
2	10k	MILK	4.40	0.18	4.06	0.18	0.32	0.07	-0.04	0.52
2	1k	<i>K. oxytoca</i> (K0005)	3.31	0.13	3.47	0.17	-0.15	0.05	-0.29	0.02
2	100	<i>E. coli</i> (EC54)	2.34	0.20	2.48	0.32	-0.14	0.44	-0.32	0.61
3	1k	MILK ^g	4.04	0.00	3.00	0.35	1.04	0.00	0.54	2.91
3	100	<i>K. oxytoca</i> (K0005)	1.46	0.00	1.74	0.14	-0.28	0.02	0.02	0.28
3	10	<i>E. coli</i> (EC54)	1.63	0.00	1.20	0.13	0.43	0.29	-0.53	0.41
1	10k	RAW CHICKEN	3.69	0.31	3.34	0.08	0.35	0.06	-0.02	0.51
1	1k	Naturally	2.43	0.16	3.07	0.21	-0.64	0.01	-0.96	-0.31
1	100	Contaminated	1.66	0.14	1.94	0.19	-0.29	0.15	-0.46	0.16
2	10k	RAW CHICKEN	3.07	0.13	2.97	0.38	0.07	0.75	-0.50	0.64
2	1k	Naturally	2.44	0.01	3.10	0.20	-0.66	0.01	-0.61	-0.30
2	100	Contaminated	1.45	0.10	1.33	0.20	-0.09	0.71	-0.43	0.55
1	10k	RTE HAM	3.61	0.33	3.78	0.44	-0.11	0.79	-0.53	0.49
1	1k	<i>C. diversus</i> (C0011)	3.22	0.33	3.69	0.23	-0.45	0.07	-0.59	0.06
1	100	<i>E. coli</i> (EC 67)	2.06	0.20	2.67	0.13	-0.55	0.05	-0.56	0.01
1	10k	PRAWN	3.09	0.24	3.00	0.35	0.04	0.90	-0.44	0.52
1	1k	Naturally	1.98	0.23	2.07	0.04	-0.02	0.86	-0.25	0.22
1	100	Contaminated	1.05	0.23	2.04	0.04	-0.99	0.00	-1.26	-0.73
1	1000	MINERAL	3.71	0.24	3.89	0.34	-0.17	0.58	-0.44	0.43
1	100	<i>C. freundii</i> (C0012)	2.78	0.15	2.76	0.17	-0.06	0.72	-0.51	0.39
1	10	<i>E. coli</i> (EC 19)	2.61	0.25	2.22	0.13	0.39	0.09	-0.68	0.11

^aTarget levels in cfu/gram^bMean result for the reference method relevant to each food type^cRepeatability standard deviation^dP-value for a 2-tail unmatched t-test, p-value <0.05 indicates significance at the 95% confidence level^e95% Lower confidence limit for difference of means^f95% Upper confidence limit for difference of means^gTest conducted at the independent laboratory

Table 10. Enumeration of *E. coli* using Micro-Snap *E. coli* Detection Device vs. Reference Method – SS Plus Luminometer (1)

Run	Target Level ^a	FOOD	Ref. mean ^b	Ref. s _r ^c	Micro-Snap mean	Micro-Snap s _r	Mean difference	p-value ^d	95% LCL ^e	95% UCL ^f
1	10K	BEEF	3.71	0.24	3.46	0.18	0.25	0.55	-0.38	0.50
1	1K	Naturally	2.78	0.15	2.56	0.23	0.13	0.53	-0.42	0.49
1	100	Contaminated	2.61	0.25	2.18	0.11	0.43	0.00	0.19	0.67
2	10K	BEEF	4.90	0.15	4.47	0.25	0.43	0.01	0.35	0.51
2	1K	<i>E. cloacae</i> (E0002)	3.62	0.42	4.15	0.21	-0.47	0.13	-0.43	0.23
2	100	<i>E. coli</i> ATCC 8739	2.63	0.27	2.87	0.18	-0.25	0.13	-0.60	0.11
3	10K	BEEF ^g	4.66	0.00	4.38	0.11	0.28	0.17	-0.18	0.44
3	1K	Naturally	3.58	0.00	2.80	NA	1.78	NA	NA	NA
3	100	Contaminated	0.79	0.00	0.88	0.15	-0.08	0.49	-0.39	0.23
1	10K	BLT	4.18	0.14	4.00	0.36	0.15	0.48	-0.38	0.67
1	1K	<i>K. pneumoniae</i> ATCC 700603	3.51	0.42	3.33	0.20	0.06	0.73	-0.43	0.46
1	100	<i>E. coli</i> NCTC 13216	2.11	0.20	2.33	0.23	-0.18	0.17	-0.48	0.12
1	10K	COD	4.50	0.31	4.30	0.10	0.19	0.26	-0.22	0.61
1	1K	Naturally	3.85	0.19	4.15	0.20	-0.30	0.14	-0.75	0.16
1	100	Contaminated	2.70	0.25	2.73	0.18	-0.04	0.60	-0.24	0.16
2	10K	COD	3.42	0.31	3.69	0.19	-0.27	0.23	-0.40	0.26
2	1K	Naturally	2.84	0.47	2.73	0.15	0.11	0.53	-0.34	0.55
2	100	Contaminated	1.94	0.22	2.53	0.17	-0.59	0.01	-0.97	-0.22
1	10K	COOKED CHICKEN	3.66	0.26	3.66	0.48	-0.01	0.98	-0.50	0.61
1	1K	<i>E. aerogenes</i> ATCC 10006	3.04	0.49	3.18	0.18	-0.12	0.64	-0.48	0.59
1	100	<i>E. coli</i> ATCC 25922	2.04	0.09	1.94	0.22	0.10	0.36	-0.17	0.38
1	10K	LETTUCE	4.03	0.24	3.80	0.21	0.23	0.25	-0.25	0.51
1	1K	<i>K. pneumoniae</i> (ESBL 13)	2.93	0.09	2.96	0.44	-0.03	0.91	-0.41	0.35
1	100	<i>E. coli</i> (EC 64)	2.13	0.55	1.94	0.16	0.18	0.30	-0.25	0.41
1	10k	MILK	4.47	0.31	4.30	0.10	0.19	0.26	-0.22	0.61
1	1k	<i>K. oxytoca</i> (K0005)	3.85	0.19	4.15	0.20	-0.30	0.14	-0.75	0.16
1	100	<i>E. coli</i> (EC54)	2.70	0.25	2.73	0.18	-0.04	0.60	-0.24	0.16
2	10k	MILK	4.40	0.18	3.79	0.18	0.60	0.03	0.09	1.13
2	1k	<i>K. oxytoca</i> (K0005)	3.31	0.13	3.28	0.26	0.03	0.78	-0.27	0.33
2	100	<i>E. coli</i> (EC54)	2.34	0.20	2.55	0.31	-0.35	0.03	-0.64	-0.05
3	1k	MILK ^g	4.04	0.00	3.42	0.09	0.62	0.03	0.04	0.80
3	100	<i>K. oxytoca</i> (K0005)	1.46	0.00	1.60	0.15	-0.14	0.25	-0.43	0.15
3	10	<i>E. coli</i> (EC54)	1.63	0.00	1.78	0.11	-0.14	0.05	-0.25	0.03
1	10k	RAW CHICKEN	3.69	0.31	3.80	0.11	-0.11	0.46	-0.51	0.28
1	1k	Naturally	2.43	0.16	2.94	0.25	-0.45	0.05	-0.92	0.01
1	100	Contaminated	1.66	0.14	2.14	0.19	-0.48	0.02	-0.71	-0.11
2	10k	RAW CHICKEN	3.07	0.13	3.20	0.17	-0.13	0.38	-0.50	0.23
2	1k	Naturally	2.44	0.01	2.69	0.24	-0.26	0.11	-0.60	0.09
2	100	Contaminated	1.45	0.10	2.51	0.21	-1.07	0.00	-1.57	-0.58
1	10k	RTE HAM	3.61	0.33	3.66	0.25	-0.05	0.86	-0.53	0.46
1	1k	<i>C. diversus</i> (C0011)	3.22	0.33	3.36	0.38	-0.11	0.66	-0.47	0.36
1	100	<i>E. coli</i> (EC 67)	2.06	0.20	2.35	0.12	-0.29	0.14	-0.42	0.15
1	10k	PRAWN	3.09	0.24	2.70	0.37	0.35	0.21	-0.32	0.62
1	1k	Naturally	1.98	0.23	1.82	0.04	0.23	0.06	-0.01	0.46
1	100	Contaminated	1.05	0.23	1.63	0.14	-0.51	0.04	-0.61	0.01
1	1000	MINERAL	3.71	0.24	3.46	0.18	0.25	0.55	-0.38	0.50
1	100	<i>C. freundii</i> (C0012)	2.78	0.15	2.56	0.23	0.13	0.53	-0.42	0.49
1	10	<i>E. coli</i> (EC 19)	2.61	0.25	2.18	0.11	0.43	0.00	0.19	0.67

^aTarget levels in cfu/gram^bMean result for the reference method relevant to each food type^cRepeatability standard deviation^dP-value for a 2-tail unmatched t-test, p-value <0.05 indicates significance at the 95% confidence level^e95% Lower confidence limit for difference of means^f95% Upper confidence limit for difference of means^gTest conducted at the independent laboratory

Table 11. Detection of Coliforms using Micro-Snap Coliform Detection Device vs. Reference Method (1)

Matrix	Inoculating Strains	MPN ^a /Portion	Instrument	N ^b	Hygiena Micro-Snap Coliform Detection Device					Reference Method ^g		dPOD _c ⁱ
					Presumptive		Confirmed		dPOD _{CP} ^f	x	POD _R ^h	
					X ^c	POD _{CP} ^d	x	POD _{CC} ^e				
Raw ground beef - 1	Naturally Contaminated	201 (124,281)	SS Plus	5	5	1.00 (0.84, 1.00)	5	1.00 (0.84, 1.00)	0.00 (-0.26, 0.26)	5	1.00 (0.84, 1.00)	0.00 (-0.26, 0.26)
			EnSURE	5	5	1.00 (0.84, 1.00)	5	1.00 (0.84, 1.00)	0.00 (-0.26, 0.26)	5	1.00 (0.84, 1.00)	0.00 (-0.26, 0.26)
			Pi102	5	5	1.00 (0.84, 1.00)	5	1.00 (0.84, 1.00)	0.00 (-0.26, 0.26)	5	1.00 (0.84, 1.00)	0.00 (-0.26, 0.26)
		254 (185,320)	SS Plus	20	19	0.95 (0.76, 1.00)	19	0.95 (0.76, 1.00)	0.00 (-0.19, 0.19)	20	1.00 (0.84, 1.00)	-0.05 (-0.24, 0.12)
			EnSURE	20	19	0.95 (0.76, 1.00)	19	0.95 (0.76, 1.00)	0.00 (-0.19, 0.19)	20	1.00 (0.84, 1.00)	-0.05 (-0.24, 0.12)
			Pi102	20	19	0.95 (0.76, 1.00)	19	0.95 (0.76, 1.00)	0.00 (-0.19, 0.19)	20	1.00 (0.84, 1.00)	-0.05 (-0.24, 0.12)
Raw ground beef - 2	<i>E. cloacae</i> (E0002) <i>E. coli</i> (ATCC 8739)	<3.0	SS Plus	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			EnSURE	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			Pi102	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
		5.02 (3.39, 6.65)	SS Plus	20	10	0.50 (0.30, 0.70)	12	0.60 (0.39, 0.78)	-0.10 (-0.37, 0.19)	11	0.55 (0.34, 0.74)	0.05 (-0.24, 0.33)
			EnSURE	20	12	0.60 (0.39, 0.78)	12	0.60 (0.39, 0.78)	0.00 (-0.28, 0.28)	11	0.55 (0.34, 0.74)	0.05 (-0.24, 0.33)
			Pi102	20	11	0.55 (0.34, 0.74)	12	0.60 (0.39, 0.78)	-0.05 (-0.33, 0.24)	11	0.55 (0.34, 0.74)	0.00 (-0.28, 0.28)
Raw ground beef ⁱ	Naturally contaminated	9.76 (5.98, 13.50)	SS Plus	20	12	0.60 (0.39, 0.78)	15	0.75 (0.53, 0.89)	-0.15 (-0.40, 0.13)	17	0.85 (0.64, 0.95)	-0.25 (-0.48, 0.03)
			EnSURE	20	12	0.60 (0.39, 0.78)	15	0.75 (0.53, 0.89)	-0.15 (-0.40, 0.13)	17	0.85 (0.64, 0.95)	-0.25 (-0.48, 0.03)
			Pi102	20	14	0.70 (0.48, 0.85)	15	0.75 (0.53, 0.89)	-0.05 (-0.31, 0.22)	17	0.85 (0.64, 0.95)	-0.15 (-0.39, 0.11)
Raw cod - 1	Naturally contaminated	3.1	SS Plus	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	1	0.05 (0.00, 0.24)	-0.05 (-0.24, 0.12)
			EnSURE	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	1	0.05 (0.00, 0.24)	-0.05 (-0.24, 0.12)
			Pi102	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	1	0.05 (0.00, 0.24)	-0.05 (-0.24, 0.12)
		8.61 (3.21-12.82)	SS Plus	20	16	0.80 (0.58, 0.92)	16	0.80 (0.58, 0.92)	0.00 (-0.44, 0.44)	17	0.85 (0.64, 0.95)	-0.05 (-0.29, 0.19)
			EnSURE	20	19	0.95 (0.76, 1.00)	16	0.80 (0.58, 0.92)	0.15 (-0.07, 0.37)	17	0.85 (0.64, 0.95)	-0.05 (-0.29, 0.19)
			Pi102	20	19	0.95 (0.76, 1.00)	16	0.80 (0.58, 0.92)	0.15 (-0.07, 0.37)	17	0.85 (0.64, 0.95)	-0.05 (-0.29, 0.19)
Raw cod - 2	Naturally contaminated	<3.0	SS Plus	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			EnSURE	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			Pi102	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
		3.36 (1.42, 4.78)	SS Plus	20	15	0.75 (0.53, 0.89)	14	0.70 (0.48, 0.85)	0.05 (-0.22, 0.31)	11	0.55 (0.34, 0.74)	0.15 (-0.14, 0.41)
			EnSURE	20	16	0.80 (0.58, 0.92)	14	0.70 (0.48, 0.85)	0.10 (-0.17, 0.35)	11	0.55 (0.34, 0.74)	0.15 (-0.14, 0.41)
			Pi102	20	14	0.70 (0.48, 0.85)	14	0.70 (0.48, 0.85)	0.00 (-0.27, 0.27)	11	0.55 (0.34, 0.74)	0.15 (-0.14, 0.41)
Cooked	<i>E. aerogenes</i> (ATCC 10006) <i>E. coli</i>	<3.0	SS Plus	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			EnSURE	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			Pi102	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)

Hygiena MicroSnap Coliform & E. coli, AOAC Performance Tested MethodsSM Certification Number 071302

chicken	(ATCC 25922)	6.72 (5.31, 8.1)	SS Plus	20	14	0.70 (0.48, 0.85)	16	0.80 (0.58, 0.92)	-0.10 (-0.35, 0.17)	14	0.70 (0.48, 0.85)	0.00 (-0.27, 0.27)
			EnSURE	20	17	0.85 (0.64, 0.95)	16	0.80 (0.58, 0.92)	0.05 (-0.19, 0.29)	14	0.70 (0.48, 0.85)	0.10 (-0.17, 0.35)
			Pi102	20	17	0.85 (0.64, 0.95)	16	0.80 (0.58, 0.92)	0.05 (-0.19, 0.29)	14	0.70 (0.48, 0.85)	0.10 (-0.17, 0.35)
Milk - 2	<i>K. oxytoca</i> (K0005) <i>E. coli</i> (EC 54)	<3.0	SS Plus	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			EnSURE	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			Pi102	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
		5.7 (2.4, 7.7)	SS Plus	20	15	0.75 (0.53, 0.89)	15	0.75 (0.53, 0.89)	0.00 (-0.26, 0.26)	17	0.85 (0.64, 0.95)	-0.10 (-0.34, 0.15)
			EnSURE	20	15	0.75 (0.53, 0.89)	15	0.75 (0.53, 0.89)	0.00 (-0.26, 0.26)	17	0.85 (0.64, 0.95)	-0.10 (-0.34, 0.15)
			Pi102	20	16	0.80 (0.58, 0.92)	15	0.75 (0.53, 0.89)	0.05 (-0.21, 0.30)	17	0.85 (0.64, 0.95)	-0.10 (-0.34, 0.15)
Milk ^j	<i>K. oxytoca</i> (K0005) <i>E. coli</i> (EC 54)	<10	SS Plus	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			EnSURE	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			Pi102	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
		13.8 (6.12, 20.3)	SS Plus	20	19	0.95 (0.76, 1.00)	15	0.75 (0.53, 0.89)	0.20 (-0.03, 0.42)	17	0.85 (0.64, 0.95)	-0.10 (-0.34, 0.15)
			EnSURE	20	16	0.80 (0.58, 0.92)	15	0.75 (0.53, 0.89)	0.05 (-0.21, 0.30)	17	0.85 (0.64, 0.95)	-0.10 (-0.34, 0.15)
			Pi102	20	16	0.80 (0.58, 0.92)	15	0.75 (0.53, 0.89)	0.05 (-0.21, 0.30)	17	0.85 (0.64, 0.95)	-0.10 (-0.34, 0.15)
Raw chicken - 1	Naturally contaminated	<3.0	SS Plus	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			EnSURE	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			Pi102	5	1	0.20 (0.08, 0.42)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	1	0.05 (0.00, 0.24)	-0.05 (-0.24, 0.12)
		4.43 (3.15, 5.71)	SS Plus	20	15	0.75 (0.53, 0.89)	16	0.80 (0.58, 0.89)	-0.05 (-0.30, 0.21)	18	0.90 (0.76, 1.00)	-0.15 (-0.38, 0.09)
			EnSURE	20	17	0.85 (0.64, 0.95)	16	0.80 (0.58, 0.89)	0.05 (-0.19, 0.29)	18	0.90 (0.76, 1.00)	-0.10 (-0.33, 0.13)
			Pi102	20	16	0.80 (0.58, 0.89)	16	0.80 (0.58, 0.89)	0.00 (-0.25, 0.25)	18	0.90 (0.76, 1.00)	-0.10 (-0.33, 0.13)
Raw chicken - 2	Naturally contaminated	<3.0	SS Plus	5	0	0.00 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	1	0.05 (0.00, 0.24)	-0.05 (-0.24, 0.12)
			EnSURE	5	0	0.00 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	1	0.05 (0.00, 0.24)	-0.05 (-0.24, 0.12)
			Pi102	5	1	0.20 (0.08, 0.42)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	1	0.05 (0.00, 0.24)	-0.05 (-0.24, 0.12)
		1.35 (0.22, 2.48)	SS Plus	20	9	0.45 (0.26, 0.66)	8	0.40 (0.22, 0.61)	0.05 (-0.24, 0.33)	6	0.30 (0.15, 0.52)	0.10 (-0.18, 0.36)
			EnSURE	20	9	0.45 (0.26, 0.66)	8	0.40 (0.22, 0.61)	0.05 (-0.24, 0.33)	6	0.30 (0.15, 0.52)	0.10 (-0.18, 0.36)
			Pi102	20	9	0.45 (0.26, 0.66)	8	0.40 (0.22, 0.61)	0.05 (-0.24, 0.33)	6	0.30 (0.15, 0.52)	0.10 (-0.18, 0.36)
Raw prawn	Naturally contaminated	<3.0	SS Plus	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			EnSURE	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			Pi102	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
		5.46 (0.73, 9.19)	SS Plus	20	19	0.95 (0.76, 1.00)	17	0.85 (0.64, 0.95)	0.10 (-0.11, 0.32)	15	0.75 (0.53, 0.89)	0.10 (-0.15, 0.34)
			EnSURE	20	19	0.95 (0.76, 1.00)	17	0.85 (0.64, 0.95)	0.10 (-0.11, 0.32)	15	0.75 (0.53, 0.89)	0.10 (-0.15, 0.34)
			Pi102	20	17	0.95 (0.76, 1.00)	17	0.85 (0.64, 0.95)	0.00 (-0.44, 0.44)	15	0.75 (0.53, 0.89)	0.10 (-0.15, 0.34)
Mineral water	<i>C. freundii</i> (C0012) <i>E. coli</i>	<1.00	SS Plus	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			EnSURE	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)

		3.3 (1.4, 5.2)	Pi102	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			SS Plus	20	8	0.40 (0.22, 0.61)	8	0.40 (0.22, 0.61)	0.00 (-0.28, 0.28)	7	0.35 (0.18, 0.57)	0.05 (-0.23, 0.32)
			EnSURE	20	7	0.35 (0.18, 0.57)	8	0.40 (0.22, 0.61)	-0.05 (-0.32, 0.23)	7	0.35 (0.18, 0.57)	0.00 (-0.26, 0.26)
			Pi102	20	12	0.60 (0.39, 0.78)	8	0.40 (0.22, 0.61)	0.20 (-0.10, 0.46)	7	0.35 (0.18, 0.57)	0.05 (-0.23, 0.32)
Cooked chicken	<i>E. aerogenes</i> (ATCC 10006) <i>E. coli</i> (ATCC 25922)	<3.0	SS Plus	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			EnSURE	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			Pi102	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
		4.5 (3.4, 5.6)	SS Plus	20	15	0.75 (0.53, 0.89)	14	0.70 (0.48, 0.85)	0.05 (-0.22, 0.31)	18	0.90 (0.48, 0.85)	-0.20 (-0.43, 0.05)
			EnSURE	20	15	0.75 (0.53, 0.89)	14	0.70 (0.48, 0.85)	0.05 (-0.22, 0.31)	18	0.90 (0.48, 0.85)	-0.20 (-0.43, 0.05)
			Pi102	20	16	0.80 (0.58, 0.92)	14	0.70 (0.48, 0.85)	0.10 (-0.17, 0.35)	18	0.90 (0.48, 0.85)	-0.20 (-0.43, 0.05)
Milk - 2	<i>K. oxytoca</i> (K0005) <i>E. coli</i> (EC 54)	<10	SS Plus	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			EnSURE	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			Pi102	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
		11.2 (5.5, 16.2)	SS Plus	20	16	0.80 (0.58, 0.92)	15	0.75 (0.53, 0.89)	0.05 (-0.21, 0.30)	13	0.65 (0.43, 0.82)	0.10 (-0.18, 0.36)
			EnSURE	20	16	0.80 (0.58, 0.92)	15	0.75 (0.53, 0.89)	0.00 (-0.26, 0.26)	13	0.65 (0.43, 0.82)	0.10 (-0.18, 0.36)
			Pi102	20	13	0.65 (0.43, 0.82)	15	0.75 (0.53, 0.89)	0.05 (-0.21, 0.30)	13	0.65 (0.43, 0.82)	0.00 (-0.28, 0.28)
Milk ⁱ	<i>K. oxytoca</i> (K0005) <i>E. coli</i> (EC 54)	<10	SS Plus	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			EnSURE	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			Pi102	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
		28.9 (13.1, 42.3)	SS Plus	20	17	0.85 (0.64, 0.95)	14	0.70 (0.48, 0.85)	0.15 (-0.11, 0.39)	19	0.85 (0.64, 0.95)	-0.25 (-0.47, -0.01)
			EnSURE	20	17	0.85 (0.64, 0.95)	14	0.70 (0.48, 0.85)	0.15 (-0.11, 0.39)	19	0.85 (0.64, 0.95)	-0.25 (-0.47, -0.01)
			Pi102	20	18	0.90 (0.70, 0.97)	14	0.70 (0.48, 0.85)	0.20 (-0.05, 0.43)	19	0.85 (0.64, 0.95)	-0.25 (-0.47, -0.01)
Raw chicken - 1	Naturally contaminated	<3.0	SS Plus	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			EnSURE	5	0	0.00 (0.00, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)
			Pi102	5	1	0.20 (0.08, 0.42)	0	0.00 (0.00, 0.44)	0.00 (-0.44, 0.44)	1	0.05 (0.00, 0.24)	-0.05 (-0.24, 0.12)
		4.1 (3.4, 4.6)	SS Plus	20	13	0.65 (0.43, 0.82)	14	0.70 (0.48, 0.85)	-0.05 (-0.32, 0.23)	15	0.75 (0.53, 0.89)	-0.10 (-0.36, 0.18)
			EnSURE	20	14	0.70 (0.48, 0.85)	14	0.70 (0.48, 0.85)	0.00 (-0.27, 0.27)	15	0.75 (0.53, 0.89)	-0.05 (-0.31, 0.22)
			Pi102	20	16	0.80 (0.58, 0.92)	14	0.70 (0.48, 0.85)	0.10 (-0.17, 0.35)	15	0.75 (0.53, 0.89)	-0.05 (-0.31, 0.22)
Raw prawn	Naturally contaminated	<3.0	SS Plus	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			EnSURE	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
			Pi102	5	0	0 (0.00, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)	0	0 (0.00, 0.44)	0 (-0.44, 0.44)
		6.2 (4.1, 8.7)	SS Plus	20	17	0.85 (0.64, 0.95)	15	0.75 (0.53, 0.89)	0.10 (-0.15, 0.34)	18	0.90 (0.70, 0.97)	-0.15 (-0.38, 0.09)
			EnSURE	20	17	0.85 (0.64, 0.95)	15	0.75 (0.53, 0.89)	0.10 (-0.15, 0.34)	18	0.90 (0.70, 0.97)	-0.15 (-0.38, 0.09)
			Pi102	20	17	0.85 (0.64, 0.95)	15	0.75 (0.53, 0.89)	0.10 (-0.15, 0.34)	18	0.90 (0.70, 0.97)	-0.15 (-0.38, 0.09)

^aMPN = Most Probable Number is based on the POD of reference method

^bN = Number of test portions

^cx = Number of positive test portions

^dPOD_{CP} = Candidate method presumptive positive outcomes divided by the total number of trials

^ePOD_{CC} = Candidate method confirmed positive outcomes divided by the total number of trials

^fdPOD_{CP} = Difference between the candidate method presumptive result and candidate method confirmed result POD values. If the confidence interval of a dPOD does not contain zero, then the difference is statistically significant at the 5% level.

^gReference Method used was appropriate to the food type.

^bPOD_R = Reference method positive outcomes divided by the total number of trials

^dPOD_C = Difference between the candidate method confirmed result and the reference method result POD values. If the confidence interval of a dPOD does not contain zero, then the difference is statistically significant at the 5% level.

ⁱStudy conducted at the independent laboratory.

DISCUSSION OF MODIFICATION APPROVED MAY 2021 (10)

The mean log₁₀ differences for the ground beef for all comparisons (coliforms and *E. coli* measured by both the EnSURE and EnSURE Touch, each compared to the reference method results, and instruments compared to each other) were well below 0.5 for all samples tested. The 90% CIs on the mean differences between any comparison was within (-0.5, 0.5) except for a few cases. For the coliform comparisons, there were four cases that were just outside of the acceptance criterion for equivalence at the lower confidence limit, and for *E. coli*, there was one case that were just outside of the acceptance criterion for equivalence at the higher confidence limit. In general, the MicroSnap method showed good correlation to the reference method with either luminometer (EnSURE Touch and EnSURE). The three comparable MicroSnap Coliform R² values were as follows; EnSURE to MLG 3.02/BAM Ch.4 R²=0.985, for EnSURE Touch to MLG 3.02/BAM Ch.4 R²=0.989 and EnSURE to the EnSURE Touch directly R²= 0.979. The three comparable MicroSnap *E. coli* R² values were as follows; EnSURE to MLG 3.02/BAM Ch.4 R²=0.976, for EnSURE Touch to MLG 3.02/BAM Ch.4 R²=0.984 and EnSURE to the EnSURE Touch directly R²= 0.995. Both the luminometers successfully measured the same Log levels within the samples of ground beef tested.

Overall, the MicroSnap Coliform and MicroSnap *E. coli* method is capable of detecting Coliform bacteria and *E. coli* specifically at more than 3 Log range from the ground beef using both the current EnSURE Luminometer and the newly developed EnSURE Touch to a similar extent and accuracy.

Table 1. Matrix Study: MicroSnap Coliform read in the EnSURE Touch Luminometer vs. MLG 3.02/BAM Ch.4 method (10)

Matrix	Cont. level ^a	EnSURE Touch Luminometer			MLG 3.02/BAM Ch.4 method			Mean diff ^e	90% CI ^f		95% CI	
		Mean ^b	s _r ^c	RSD% ^d	Mean	s _r	RSD%		LCL ^g	UCL ^h	LCL	UCL
Fresh raw ground beef (naturally contaminated)	Low	1.68	0.16	9.3	2.02	0.10	4.80	-0.35	-0.59	-0.04	-0.66	0.03
	Low	2.26	0.17	7.40	2.52	0.06	2.40	-0.26	-0.46	-0.06	-0.52	0.00
	Low	2.71	0.14	5.30	2.66	0.06	2.10	0.05	-0.07	0.17	-0.10	0.21
	Med	3.22	0.01	0.40	3.11	0.22	7.10	0.11	-0.08	0.25	-0.17	0.39
	Med	3.78	0.18	4.70	3.96	0.23	5.92	-0.18	-0.25	0.00	-0.37	0.02
	Med	4.03	0.05	1.40	4.04	0.10	2.40	-0.01	-0.07	0.06	-0.09	0.08
	Med	4.06	0.03	0.81	4.06	0.04	0.90	0.00	-0.03	0.02	-0.04	0.00
	High	5.49	0.40	7.20	5.57	0.06	1.07	-0.08	-0.18	0.01	-0.21	0.03
	High	5.93	0.05	0.80	6.09	0.23	3.80	-0.17	-0.41	0.04	-0.47	0.10

^aContamination level for each lot of fresh raw ground beef material tested.

^bMean of five replicate portions, after logarithmic transformation: Log₁₀[CFU/g + (0.1)f].

^cRepeatability standard deviation.

^dRelative standard deviation for repeatability. Reported as a percentage.

^eMean difference between the candidate and reference methods.

^fConfidence interval.

^g95% Lower confidence limit for difference of means.

^h95% Upper confidence limit for difference of means.

Table 2. Matrix Study: MicroSnap Coliform read in the EnSURE Luminometer vs. MLG 3.02/BAM Ch.4 method (10)

Matrix	Cont. level ^a	EnSURE Luminometer			MLG 3.02/BAM Ch.4 method			Mean diff ^e	90% CI ^f		95% CI	
		Mean ^b	s _r ^c	RSD% ^d	Mean	s _r	RSD%		LCL ^g	UCL ^h	LCL	UCL
Fresh raw ground beef (naturally contaminated)	Low	2.03	0.23	11.10	2.02	0.10	4.80	0.01	-0.20	0.21	-0.26	0.28
	Low	2.40	0.12	5.10	2.52	0.06	2.40	0.12	-0.01	0.24	-0.04	0.28
	Low	2.71	0.10	3.80	2.66	0.06	2.10	0.05	-0.07	0.17	-0.10	0.20
	Low	2.95	0.04	1.30	3.11	0.22	7.10	-0.17	-0.34	0.04	-0.44	0.11
	Med	4.13	0.13	3.20	3.96	0.23	5.90	0.17	-0.12	0.41	-0.21	0.54
	Med	4.14	0.02	0.40	4.04	0.10	2.40	0.10	0.04	0.18	-0.01	0.21
	Med	4.26	0.02	0.50	4.06	0.04	0.90	0.20	0.16	0.25	0.15	0.27
	High	5.48	0.04	0.80	5.57	0.06	1.07	-0.09	-0.15	0.00	-0.02	0.18
	High	5.76	0.02	0.30	6.09	0.23	3.80	-0.33	-0.56	-0.03	-0.63	0.07

^aContamination level for each lot of fresh raw ground beef material tested.

^bMean of five replicate portions, after logarithmic transformation: Log₁₀[CFU/g + (0.1)f].

^cRepeatability standard deviation.

^dRelative standard deviation for repeatability. Reported as a percentage.

^eMean difference between the candidate and reference methods.

^fConfidence interval.

^g95% Lower confidence limit for difference of means.

^h95% Upper confidence limit for difference of means.

Table 3. Matrix Study: MicroSnap Coliform read in the EnSURE Touch Luminometer vs. EnSURE Luminometer (10)

Matrix	Cont. level ^a	EnSURE Touch Luminometer			EnSURE Luminometer			Mean diff ^e	90% CI ^f		95% CI	
		Mean ^b	s _r ^c	RSD% ^d	Mean	s _r	RSD%		LCL ^g	UCL ^h	LCL	UCL
Fresh raw ground beef (naturally contaminated)	Low	1.68	0.16	9.30	2.03	0.23	11.1	-0.35	-0.65	-0.05	-0.75	0.04
	Low	2.26	0.17	7.40	2.40	0.12	5.10	-0.14	-0.39	0.10	-0.46	0.18
	Low	2.71	0.14	5.30	2.71	0.10	3.80	0.00	-0.21	0.22	-0.28	0.28
	Med	3.22	0.01	0.40	2.95	0.04	1.30	0.28	0.15	0.21	0.23	0.32
	Med	3.78	0.18	4.70	4.13	0.13	3.20	-0.35	-0.51	0.02	-0.63	0.06
	Med	4.03	0.05	1.40	4.14	0.02	0.40	-0.11	-0.14	-0.07	-0.15	-0.06
	Med	4.06	0.03	0.81	4.26	0.02	0.50	-0.20	-0.25	-0.15	-0.26	-0.14
	High	5.49	0.40	7.20	5.48	0.04	0.80	0.01	-0.06	0.04	-0.08	0.06
High	5.93	0.05	0.80	5.76	0.02	0.30	0.16	0.06	0.21	0.09	0.23	

^aContamination level for each lot of fresh raw ground beef material tested.

^bMean of five replicate portions, after logarithmic transformation: Log₁₀[CFU/g + (0.1)f].

^cRepeatability standard deviation.

^dRelative standard deviation for repeatability. Reported as a percentage.

^eMean difference between the candidate and reference methods.

^fConfidence interval.

^g95% Lower confidence limit for difference of means.

^h95% Upper confidence limit for difference of means.

Table 4. Matrix Study: MicroSnap E. coli read in the EnSURE Touch Luminometer vs. MLG 3.02/BAM Ch.4 method (10)

Matrix	Cont. level ^a	EnSURE Touch Luminometer			MLG 3.02/BAM Ch.4 method			Mean diff ^e	90% CI ^f		95% CI	
		Mean ^b	s _r ^c	RSD% ^d	Mean	s _r	RSD%		LCL ^g	UCL ^h	LCL	UCL
Fresh raw ground beef (naturally contaminated)	Low	2.05	0.16	8.04	1.97	0.39	20.0	0.08	-0.42	0.61	-0.57	0.73
	Low	2.60	0.30	11.5	2.66	0.06	2.14	-0.06	-0.25	0.03	-0.49	0.38
	Med	3.05	0.19	6.20	2.65	0.19	7.20	0.40	0.00	0.71	-0.05	0.83
	High	3.74	0.03	0.73	3.84	0.11	2.86	-0.10	-0.18	-0.02	-0.23	0.03
	High	3.91	0.12	2.96	3.69	0.21	5.60	0.22	-0.02	0.31	-0.05	0.45
	High	4.32	0.07	1.73	4.18	0.13	3.14	0.14	-0.02	0.24	-0.06	0.33
	High	5.35	0.08	1.40	5.42	0.14	2.60	-0.07	-0.15	0.05	-0.22	0.10

^aContamination level for each lot of fresh raw ground beef material tested.

^bMean of five replicate portions, after logarithmic transformation: Log₁₀[CFU/g + (0.1)f].

^cRepeatability standard deviation.

^dRelative standard deviation for repeatability. Reported as a percentage.

^eMean difference between the candidate and reference methods.

^fConfidence interval.

^g95% Lower confidence limit for difference of means.

^h95% Upper confidence limit for difference of mean.

Table 5. Matrix Study: MicroSnap E. coli read in the EnSURE Luminometer vs. MLG 3.02/BAM Ch.4 method (10)

Matrix	Cont. level ^a	EnSURE Luminometer			MLG 3.02/BAM Ch.4 method			Mean diff ^e	90% CI ^f		95% CI	
		Mean ^b	s _r ^c	RSD% ^d	Mean	s _r	RSD%		LCL ^g	UCL ^h	LCL	UCL
Fresh raw ground beef (naturally contaminated)	Low	2.02	0.16	8.15	1.97	0.39	20.00	0.06	-0.38	0.41	-0.54	0.65
	Low	2.62	0.16	6.24	2.66	0.06	2.14	-0.04	-0.12	0.09	-0.25	0.17
	Med	2.87	0.18	6.30	2.65	0.19	7.16	0.22	-0.03	0.45	-0.11	0.55
	High	3.68	0.03	0.73	3.84	0.11	2.86	-0.16	-0.25	-0.04	-0.36	0.05
	High	3.81	0.07	1.82	3.69	0.21	5.60	0.13	-0.02	0.21	-0.10	0.36
	High	4.36	0.16	3.56	4.18	0.13	3.14	0.18	0.04	0.21	-0.01	0.37
	High	5.29	0.04	0.70	5.42	0.14	2.60	-0.12	-0.18	0.01	-0.28	0.04

^aContamination level for each lot of fresh raw ground beef material tested.

^bMean of five replicate portions, after logarithmic transformation: Log₁₀[CFU/g + (0.1)f].

^cRepeatability standard deviation.

^dRelative standard deviation for repeatability. Reported as a percentage.

^eMean difference between the candidate and reference methods.

^fConfidence interval.

^g95% Lower confidence limit for difference of means.

^h95% Upper confidence limit for difference of means.

Table 6. Matrix Study: MicroSnap E. coli read in the EnSURE Touch Luminometer vs. EnSURE Luminometer (10)

Matrix	Cont. level ^a	EnSURE Touch Luminometer			EnSURE Luminometer			Mean diff ^e	90% CI ^f		95% CI	
		Mean ^b	s _r ^c	RSD% ^d	Mean	s _r	RSD%		LCL ^g	UCL ^h	LCL	UCL
Fresh raw ground beef (naturally contaminated)	Low	2.05	0.16	8.04	2.02	0.16	8.15	0.03	-0.15	0.18	-0.24	0.29
	Low	2.60	0.30	11.5	2.62	0.16	6.24	-0.02	-0.34	0.35	-0.48	0.46
	Med	3.05	0.19	6.20	2.87	0.18	6.30	0.18	0.00	0.25	-0.04	0.39
	High	3.74	0.03	0.73	3.68	0.09	2.58	0.06	-0.02	0.12	-0.09	0.21
	High	3.91	0.12	2.96	3.81	0.07	1.82	0.10	-0.03	0.12	-0.05	0.24
	High	4.32	0.07	1.73	4.36	0.16	3.56	-0.04	-0.19	0.15	-0.31	0.23
	High	5.35	0.08	1.40	5.29	0.04	0.70	0.06	-0.01	0.09	-0.05	0.17

^aContamination level for each lot of fresh raw ground beef material tested.

^bMean of five replicate portions, after logarithmic transformation: $\text{Log}_{10}[\text{CFU/g} + (0.1)\text{f}]$.

^cRepeatability standard deviation.

^dRelative standard deviation for repeatability. Reported as a percentage.

^eMean difference between the candidate and reference methods.

^fConfidence interval.

^g95% Lower confidence limit for difference of means.

^h95% Upper confidence limit for difference of means.

REFERENCES CITED

- Hygiena International., Evaluation of the MicroSnap Coliform & MicroSnap E. coli, AOAC Performance Tested MethodsSM certification number 071302.
- AOAC Research Institute Validation Outline for MicroSnap Coliform & MicroSnap E. coli, Approved – July 2013.
- Official Methods of Analysis (2019), 21st Ed., 966.24, AOAC INTERNATIONAL, Rockville, MD
- U.S. Food and Drug Administration Bacteriological Analytical Manual (FDA-BAM), Chapter 4, <http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/UCM064948>
- The Standard Methods for the Examination of Dairy Products (SMEDP), Chapter 7, 17th edition, 2004, APHA; <http://www.apha.org/about/news/pressreleases/2004/04revised.htm>
- Least Cost Formulations, Ltd. , AOAC Binary Data Interlaboratory Study Workbook (2011), <http://lcfild.com/aoac/aoac-binary-v2-2.xls>
- Methods Committee Guidelines for Validation of Microbiological Methods for Food and Environmental Surfaces AOAC INTERNATIONAL, 2012 http://www.aoac.org/vmeth/AOAC_Validation_Guidelines_for_Food_Microbiology-Prepub_version.pdf
- Feldsine et al, *J. Assoc. Off. Anal. Chem.*, (2002), **85**, 1038
- Meighan, P., Katz, B., and Nikooei, D., Evaluation of the MicroSnap Coliform and MicroSnap E. coli for the Enumeration of Coliform and E. coli Bacteria in Ground Beef: Level 2 Modification to Validate the Handheld EnSURE Touch luminometer, AOAC Performance Tested MethodsSM certification number 071302. Approved May 2021.
- U.S. FDA Bacteriological Analytical Manual Ch. 4 (2017), Enumeration of *Escherichia coli* and the Coliform Bacteria