

Validation of a Standardized Protocol to Establish Microbial Baselines in Poultry Facilities

Indhira Margarita Pulinario¹, Ilan Arvelo², Samuel Peabody², Marcos, Sanchez -Plata, Ph.D²
¹Zamorano University, SOWER Scholar, ² Texas Tech University

ICFIE, Department of Animal and Food Sciences.

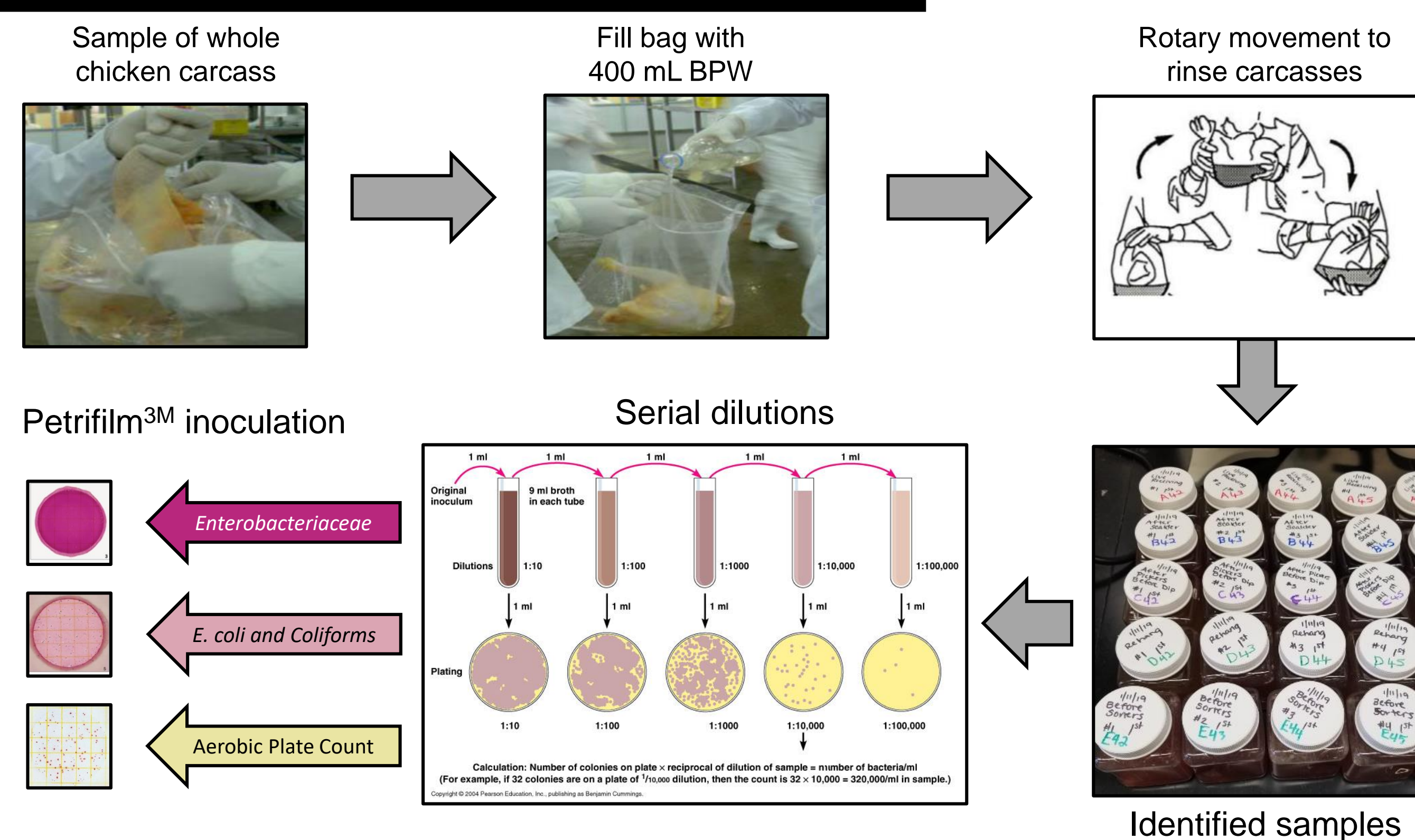
Introduction

- Poultry products are subjected to USDA-Food Safety and Inspection Service (FSIS) inspection before commercialization. In-line inspection requires a speed of 35 birds per minute to assure proper observation and when necessary removal of carcasses from the line for further inspection and product disposition.
- Since 1999, FSIS evaluated the performance of a modernized inspection system, known as HIMP (HACCP-Base Inspection Models Project), and recently authorized facilities to consider the implementation of new inspection systems and line speeds up to 170 bpm.
- The New Poultry Inspection System (NPIS) requires a methodology to demonstrate microbial control when compared with the traditional inspection system; and if new line speeds are considered, they also need to be compared with a conventional microbial baseline.

Objectives

- Conduct a biomapping study of indicator bacteria to validate a new standardized protocol to establish microbial baselines to support processing modifications based on the New Poultry Inspection System (NPIS).
- Determine microbial levels of Aerobic plate counts, Enterobacteriaceae, Coliforms and *Escherichia coli* during the chicken slaughtering process and develop statistical process control parameters.

Materials and Methods



MATERIALS:

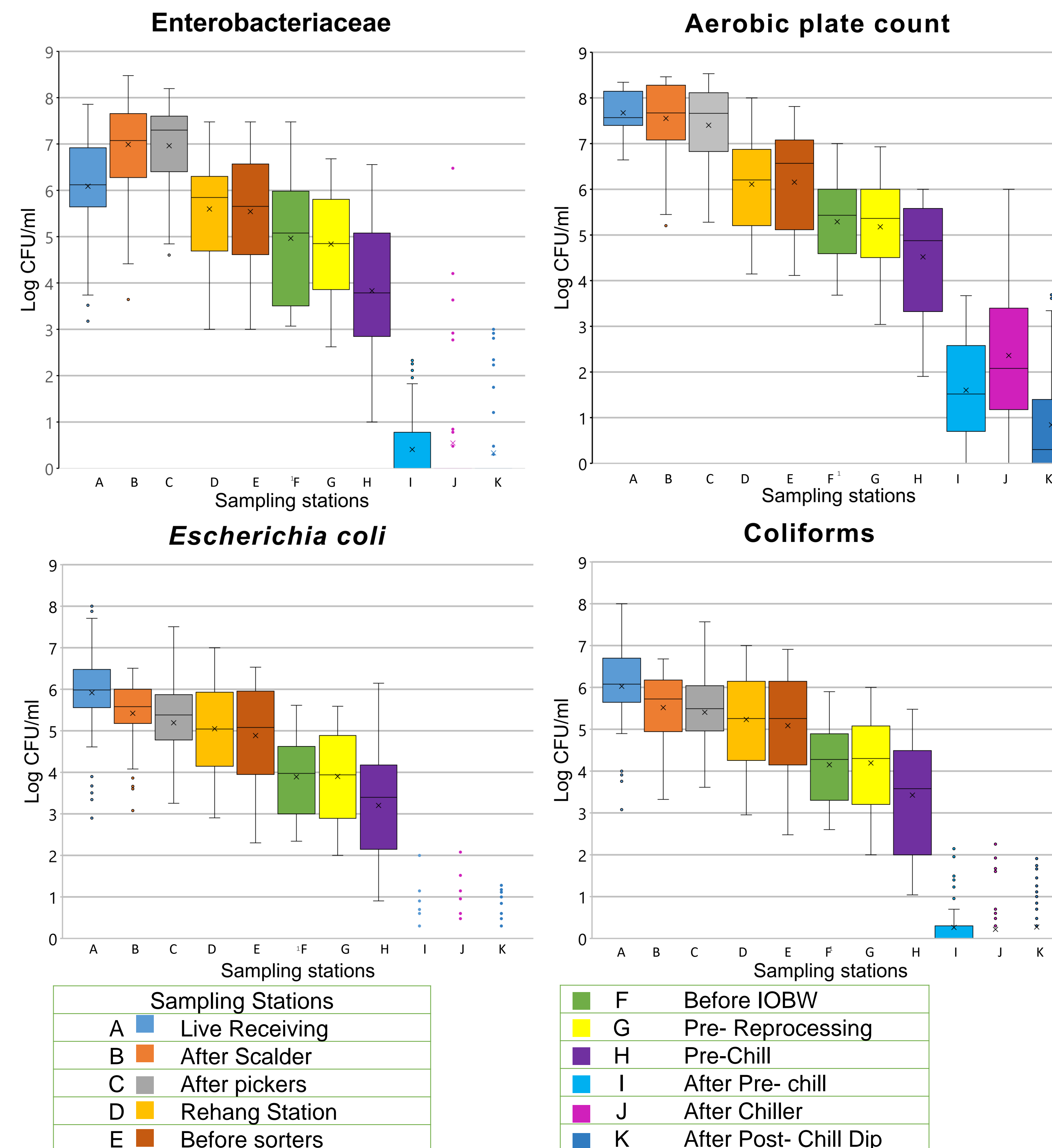
- Buffered Peptone Water (BPW)
- Petrifilm^{3M} Violet Red Bile for generic *Escherichia coli* and Coliforms, Petrifilm^{3M} Violet Red Bile Glucose (VRBG) for Enterobacteriaceae and Petrifilm^{3M} with standard nutrients for Aerobic plate counts.

METHODS:

- To take samples(carcasses rinse) from 11 sampling stations during a week of processing N= 10 samples per station per 5 days.
- Serial dilution from 10⁻¹ to 10⁻⁴ using 1 ml of chicken rinsate in 9 ml of BPW and plating in Petrifilm^{3M}.

Results

Graph of Biomapping



Conclusions

- A detailed biomap on the microbial indicator loads at 11 different stations during chicken processing was developed for a commercial processing facility.
- The reduction for APC showed the most representative microbial load of 6.8 Log, that represents a reduction of 99.9999% of the total initial population.
- Enterobacteriaceae, Coliforms and *Escherichia coli* showed a reduction of 5.7 Log (99.999% of the total initial population).
- The utilization of Peracetic acid as an antimicrobial intervention was principally responsible for the reduction in the sampling site C-D and H-I, for this reason, it is possible to have less than 1 Log₁₀ CFU/mL in the final processing stations.
- This methodology is effective for processors to demonstrate process control when changes are implemented.



Bacteria	Sample Station	n	Mean	Minimum	Maximum	Standard deviation
Aerobic plate count Log ₁₀ CFU/ mL	A	51	7.68	6.64	8.34	0.48
	B	51	7.55	5.20	8.46	0.83
	C	51	7.40	5.28	8.53	0.89
	D	51	6.11	4.15	8.00	1.07
	E	51	6.16	4.11	7.81	1.08
	F	51	5.29	3.68	7.00	0.95
	G	51	5.18	3.04	6.93	0.94
	H	51	4.52	1.90	6.00	1.22
	I	51	1.60	0.00	3.67	1.12
	J	51	2.36	0.00	6.00	1.33
	K	51	0.84	0.00	3.69	1.15
Enterobacteriaceae Log ₁₀ CFU/ mL	A	51	6.09	3.18	7.86	1.14
	B	51	6.99	3.64	8.48	1.13
	C	51	6.96	4.60	8.20	0.89
	D	51	5.60	3.00	7.48	1.03
	E	51	5.54	3.00	7.48	1.23
	F	51	4.97	3.07	7.48	1.27
	G	51	4.84	2.62	6.68	1.16
	H	51	3.83	1.00	6.56	1.41
	I	51	0.41	0.00	2.33	0.74
	J	51	0.55	0.00	6.48	1.36
	K	51	0.33	0.00	3.00	0.84
Coliforms Log ₁₀ CFU/ mL	A	51	6.03	3.08	8.00	1.07
	B	51	5.52	3.32	6.68	0.85
	C	51	5.41	3.61	7.57	0.88
	D	51	5.23	2.95	7.00	1.04
	E	51	5.09	2.48	6.91	1.11
	F	51	4.15	2.60	5.90	0.90
	G	51	4.19	2.00	6.00	1.07
	H	51	3.43	1.04	5.48	1.34
	I	51	0.26	0.00	2.15	0.55
	J	51	0.22	0.00	2.26	0.56
	K	51	0.27	0.00	1.91	0.55
<i>Escherichia coli</i> Log ₁₀ CFU/ mL	A	51	5.92	2.90	8.00	1.10
	B	51	5.42	3.08	6.51	0.84
	C	51	5.19	3.26	7.51	0.91
	D	51	5.05	2.90	7.00	1.03
	E	51	4.89	2.30	6.53	1.10
	F	51	3.89	2.34	5.61	0.87
	G	51	3.90	2.00	5.59	1.11
	H	51	3.20	0.90	6.15	1.35
	I	51	0.13	0.00	2.00	0.37
	J	51	0.16	0.00	2.08	0.44
	K	51	0.15	0.00	1.28	0.34

References

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