Comparison of Environmental Sampling Method Efficacy for Detection of *Listeria* from Food Contact Surfaces

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Introduction:

Listeria is a major cause of food-borne illness and the third leading cause of food-borne death in the USA. The bacterium's resilient ability to persist in extreme conditions is particularly relevant to the food industry. As a result, industry vigilance in detection of *Listeria* is critical for prevention of Listeriosis.

Purpose:

This study evaluates the ability of various environmental sampling swab types including Microsnap Total, Microsnap Surface Express, and Insite Listeria to recover *Listeria spp* (Figure 2.). from stainless steel as compared to traditional contact plate sampling method.

Methods:

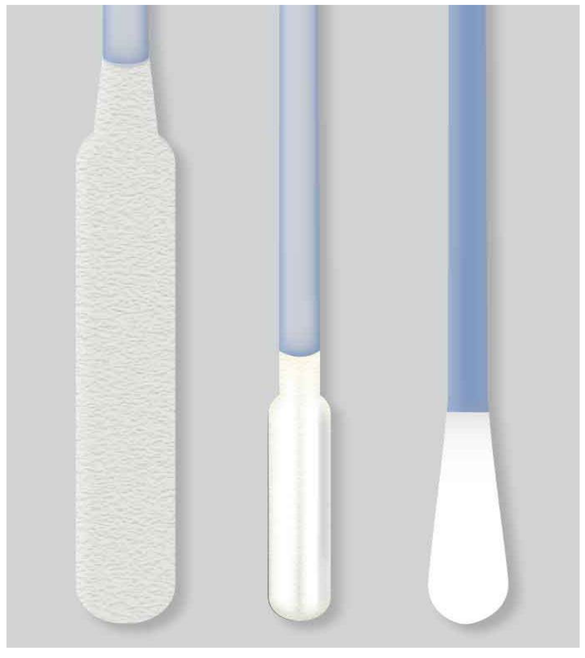
Listeria monocytogenes was enriched overnight in a suitable broth and serially diluted. Aliquots of 100uL were applied to 4x4" stainless steel surfaces and allowed to dry for 24 hours, until visibly dry. The surfaces were swabbed by each of the four sampling methods (n=5), premoistened with MRD. The swabbed samples and unswabbed control surfaces were suspended in 50mL of MRD and analysed for recovery of *Listeria spp.*

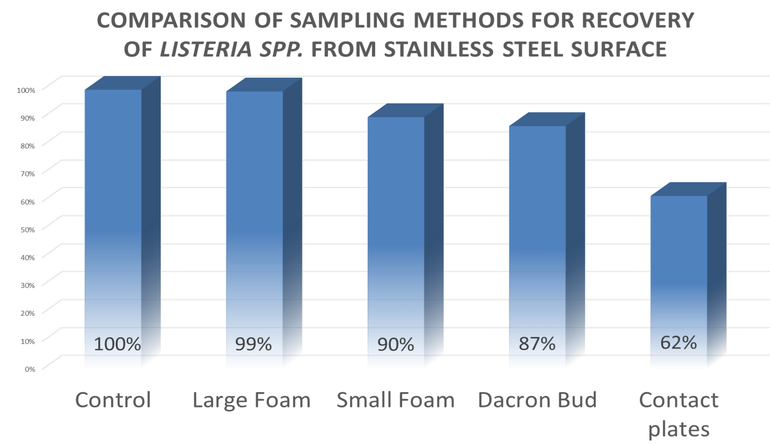
REFFERENCES:
1. Scallan, Elaine et al. "Foodborne Illness Acquired in the United States—Major Pathogens." *Emerging Infectious Diseases* 17.1 (2011): 7–15. *PMC*.
2. Orsi, Renato H., and Martin Wiedmann. "Characteristics and Distribution of *Listeria* Spp., Including *Listeria* Species Newly Described since 2009." *Applied Microbiology and Biotechnology* 100 (2016): 5273–5287. *PMC*.

Figure 1. Comparison of sampling methods for recovery of *Listeria spp* from stainless steel surface

	Control	Large Foam	Small Foam	Dacron Bud	Contact plate
	100	99	85	89	68
	100	100	99	84	58
	100	100	84	98	48
	100	100	92	78	71
	100	98	91	86	65
Mean	**100**	**99**	**90**	**87**	**62**
Std. dev.	0	1	6	7	9

Figure 2. Swab types evaluated for recover of *Listeria spp.* from stainless steel surface





Results:

Environmental sampling methods were compared for efficiency of recovery of *listeria spp.* dried on stainless steel. The four compared methods resulted in variable sampling efficiency (Figure 1). The most efficient method was the larger foam swab (99% ± 1%) followed by the small foam swab (90% ± 6%), and the dacron bud (87% ± 7%) respectively. The least efficient method was the contact plate (62% ± 9%).

Significance:

Employment of an environmental sampling method for detection of *Listeria* from food contact surfaces will help to minimize incidence food-borne illness. However, based on the data presented, it is important to consider sampling efficiency in evaluation of the method of surveillance. In conclusion, the efficiency of the sampling method can effect the probability of successful detection and disease prevention.