

A Comparison Study of the VIDAS® *Listeria* Species Xpress (LSX) with Ottaviani Agosti Agar (OAA) Method to the USDA/FSIS and AOAC Official Methods for the Specific Detection of *Listeria* Species in Meat and Dairy Products

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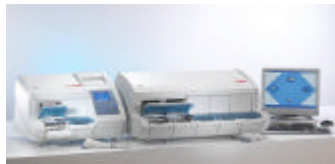
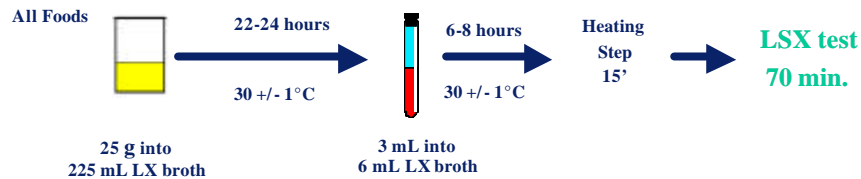
ABSTRACT

The VIDAS® *Listeria* species Xpress (LSX) test is an enzyme-linked fluorescent immunoassay (ELFA) designed for use with the automated VIDAS® or mini-VIDAS® instruments for the specific detection of *Listeria* species. The test method was validated according to AOAC Official Method guidelines for use with meat and dairy products using a 30-hour proprietary enrichment broth. The alternative method also included the use of chromogenic medium, Ottaviani Agosti Agar (OAA), for confirmation of LSX presumptive results. The alternative rapid method was compared to the USDA reference method for the detection of *Listeria* species in artificially contaminated raw pork, frankfurters, roast beef, raw ground beef and ham, and was also compared to the AOAC Official Dairy Method (993.12) for the detection of *Listeria* species in artificially contaminated yogurt, camembert cheese, pasteurized whole milk, cheddar cheese and vanilla ice cream. The number of samples found positive by VIDAS and negative by the reference methods vs. number of samples positive by the reference methods and negative by VIDAS was compared using McNemar's method for paired analysis. A χ^2 value of > 3.84 was indicative of a significant difference at the 5% probability level. The VIDAS LSX method was significantly more sensitive than the USDA method for raw pork, and was significantly more sensitive than AOAC Official Method for Camembert cheese. For all other products tested, VIDAS LSX was statistically equivalent to the reference methods. Confirmation of presumptive LSX results with the chromogenic OAA medium was shown to be equivalent to the reference method agar (modified Oxford agar [MOX] for USDA method and Oxford Agar [OXA] for AOAC 993.12).

INTRODUCTION

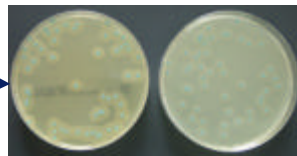
Traditional methods for the detection of *Listeria* species involve enrichment that includes several tedious and labor intensive steps. In addition, lengthy incubation periods are required to achieve final results. Rapid screening for this foodborne pathogen is extremely important for food safety because of the potential for serious disease. The objective of this study was to demonstrate the effectiveness of the VIDAS LSX method for screening of *Listeria* species in meat and dairy products in less than 30 hours after sampling, when compared to current reference methods. The VIDAS LSX method combines the use of a proprietary media, *Listeria* Xpress broth (which reduces lag time and boosts *Listeria* recovery), along with the LSX assay which incorporates a combination of polyclonal and monoclonal antibodies for increased sensitivity and specificity.

METHOD PROTOCOL



Automated VIDAS® and mini-VIDAS® instruments

VIDAS LSX positive → OAA selective isolation & presumptive confirmation



OAA chromogenic agar medium

RESULTS

MEAT PRODUCTS				LSX METHOD			USDA		SENSITIVITY %	
	MPN per 25 g	Total Samples	Total + Samples	Presumptive	Confirmed from OAA	Confirmed from MOX	USDA Positive	X ²	LSX	USDA
Ground Beef <i>L. monocytogenes</i>	10.7	20	19	18	19	19	14	2.67	94.7	73.7
	60.0	20	20	20	20	20	20	-	100	100
Raw pork <i>L. monocytogenes</i>	0.28	20	20	20	20	20	10	8.10	100	50
Frankfurters <i>L. monocytogenes</i>	5.8	20	20	19	19	19	18	0.00	95	90
Roast Beef <i>L. innocua</i>	1.08	20	12	7	7	7	9	0.13	58	75
Ham <i>L. welshimeri</i>	5.8	20	20	17	17	17	20	3.00	85	100
	5.8	20	20	20	20	20	18	1.00	100	95

DAIRY PRODUCTS				LSX METHOD			AOAC		SENSITIVITY %	
	MPN per 25 g	Total Samples	Total + Samples	Presumptive	Confirmed from OAA	Confirmed from MOX	AOAC Positive	X ²	LSX	AOAC Method
Cheddar cheese <i>L. monocytogenes</i>	0.96	20	20	18	18	18	16	0.67	90	80
	5.8	20	20	20	20	20	18	2.00	100	90
Camembert cheese <i>L. innocua</i>	0.09	20	14	12	12	12	3	4.92	85.7	21.4
Yogurt <i>L. seeligeri</i>	0.38	20	18	12	12	10	13	0	67	72
Milk <i>L. ivanovii</i>	2.4	20	20	17	18	18	16	0.14	85	80
	12.1	20	20	20	20	20	20	-	100	100
Ice Cream <i>L. innocua</i>	2.3	20	18	17	17	17	16	0.33	94.4	88.9
	11.5	20	20	20	20	20	20	-	100	100

CONCLUSION

The VIDAS LSX method performed, overall, statistically equivalent to the reference methods in the detection of *Listeria* in a variety of meat and dairy products. However, the LSX method was statistically more sensitive than the reference methods in the detection of *Listeria monocytogenes* in raw pork and *Listeria innocua* in camembert cheese. The method provides the detection of *Listeria* species in foods with negative or presumptive positive results in less than 30 hours after sampling compared to 4 days for the cultural methods. The isolation and identification of the target organism on the chromogenic OAA agar was easier compared to the traditional selective agars due to the color characteristics of the organism and the reduction in the growth of background flora.