



Development and Verification of *Salmonella* Quantification on Beef Lymph Nodes Utilizing Hygiena's BAX[®] System SalQuant[®]

BAX[®] System Q7

Gabriela K. Betancourt-Barszcz¹, David A. Vargas¹, Savannah F. Applegate², Marcos X. Sanchez-Plata¹

1. Texas Tech University, Department of Animal and Food Sciences, Lubbock, TX 79409
2. Hygiena[®], 2 Boulden Circle, New Castle, DE 19720

INTRODUCTION:

Beef lymph nodes are a well-known source of *Salmonella* and when not extracted from trim, ground beef can often become a public health concern. Quantification of *Salmonella* utilizing BAX[®] System SalQuant[®] can provide rapid, actionable results to determine *Salmonella* loads in beef lymph nodes prior to product release.

PURPOSE:

The purpose of this study was to develop and assess the performance of a rapid enumeration method for *Salmonella* in beef lymph nodes utilizing BAX System SalQuant.

REGISTERED TRADEMARKS:

BAX[®] is a registered trademark of Hygiena for its line of equipment, reagents and software used to analyze samples for microbial contamination.

SalQuant[®] is a registered trademark of Hygiena.

METHODS:

Beef lymph nodes (N=100) were procured from a commercial beef processing facility and pre-screened for *Salmonella*. Negative *Salmonella* lymph nodes (n= 38; small: 0-10 g, large: >10 g) were weighed, trimmed, sterilized for 3-5 seconds, pulverized with a rubber mallet, and spiked with 0.00 – 5.00 Log CFU/Lymph Node of *Salmonella* Typhimurium with three biological replicates per level. Primary enrichment was conducted by adding BAX MP media (small: 40 mL; large: 80 mL) to the samples homogenized and incubated at 42 °C for 6, 8, and 10 hours for recovery, then each sample was tested in quintuplet using BAX System Real-Time *Salmonella* Assay and linear fit equations were created at each timepoint utilizing Cycle Threshold (CT) values to estimate pre-enrichment levels of *Salmonella*. The timepoint utilized for BAX System SalQuant was determined through R² (≥ 0.75) and Log RMSE (≤ 0.40) using JMP[®] v. 15. Estimations were compared to MPN through 95% confidence intervals.

RESULTS:

The 6-hour linear-fit equation met statistical parameters for small and large lymph nodes with R² of 0.84 and 0.85 with a Log RMSE of 0.51 and 0.30 for small and large lymph nodes, respectively. SalQuant and MPN estimations were not statistically different.

Matrix	Timepoint (h)	R ²	Log RMSE*	Enumerable Range
Small lymph node	6 h	0.84	0.51	0 - 4 Log CFU/LN
Large lymph node	6 h	0.85	0.30	1 - 4 Log CFU/LN

*Log Root Mean Square Error

SIGNIFICANCE:

These results indicate that the BAX System SalQuant is a useful data-driven tool for beef processing facilities to determine loads of *Salmonella* in beef lymph nodes prior to ground product formulation and release, ultimately reducing risk of final product and improving food safety.

FIGURES:

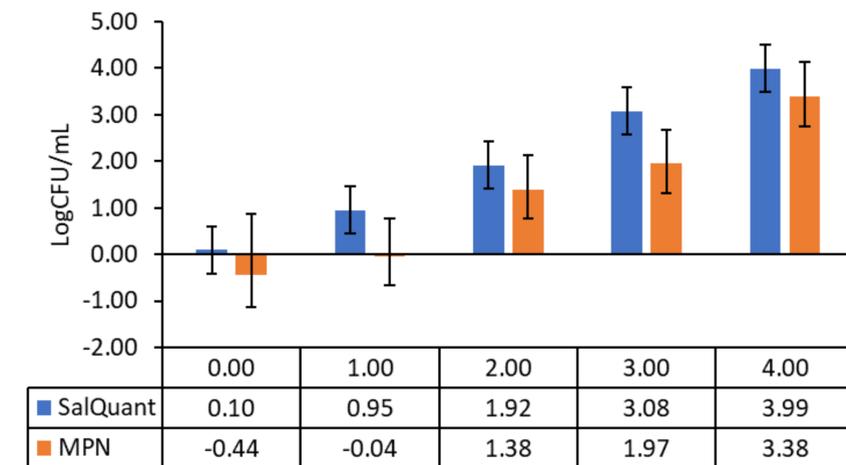


Figure 1. SalQuant Development Parameter for Small Lymph Nodes (0-10 g)

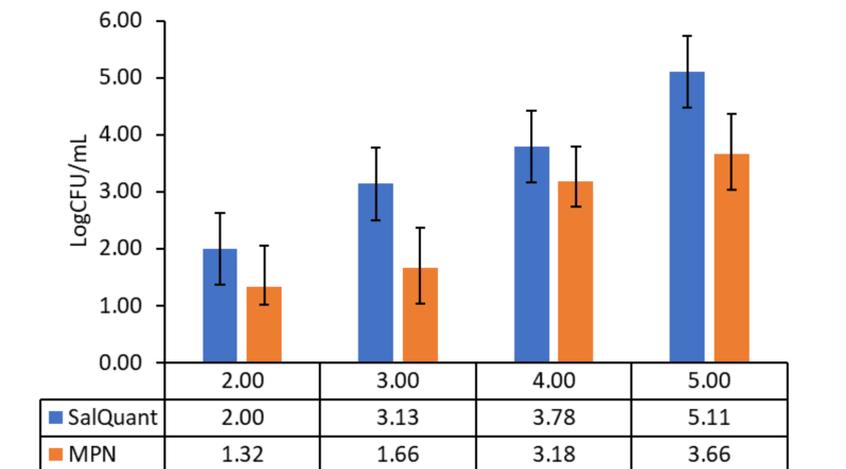


Figure 2. SalQuant Development Parameter for Large Lymph Nodes >10g