



One Health Diagnostics™

Salmonella Quantification (SalQuant®) with Hygiena's BAX® System for Turkey Carcass Swabs

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BAX® System Q7

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INTRODUCTION:

Prevalence testing in poultry for *Salmonella* provides important data but consumer illness caused by this pathogen still represents a significant portion of foodborne illnesses each year. *Salmonella* colonizes live poultry and can spread throughout the environment if pre-harvest control points on the farm do not reduce or eliminate transmission. Once *Salmonella*-positive birds enter the processing plant, it can be difficult to control which puts final products at risk of contamination. Therefore, since the probability of developing illness depends on the hosts' susceptibility and the ingested dose, the poultry industry has been seeking analytical methods, such as quantification, to manage *Salmonella* pre- and post-harvest.

PURPOSE:

1. Develop a linear equation.
2. Verify the BAX® System Real-Time PCR assay for *Salmonella* quantification (SalQuant®) in turkey carcass swabs.

REGISTERED TRADEMARKS:

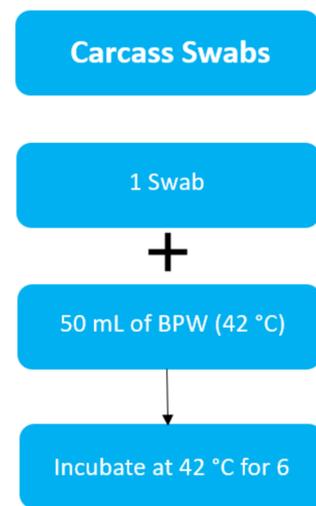
BAX® is a registered trademark of Hygiena for its line of equipment, reagents and software used to analyze samples for microbial contamination. SalQuant® is a registered trademark of Hygiena.

METHODS:

Fifteen turkey carcass swabs provided by an industry partner were inoculated with a cold stressed *Salmonella* culture to create 3 replicates across 5 levels (1, 10, 100, 1,000, and 10,000 CFU/mL). One additional sample was reserved for a negative control.

ENRICHMENT

Immediately following inoculation, swabs were enriched in 50 mL of pre-warmed (42 °C) BPW, incubated for 6 hours and then tested in quintuplet using real-time PCR. At the same time, a 3-tube x 5-dilution MPN was conducted for each inoculation level following the USDA FSIS Appendix 2.05.



FIGURES:

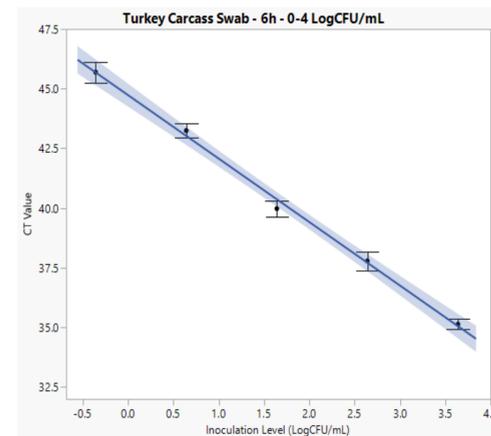


Figure 1 (Left). Mean (*Salmonella* Ct) and *Salmonella* Ct vs. Inoculated Log CFU/g

Figure 2 (Right). MPN and SalQuant comparison per inoculation level at 6 hours of enrichment

RESULTS:

At 6 hours, a curve was constructed using the total positives and cycle threshold values (Ct) from real-time PCR compared to the known inoculation levels to create a best-fit equation (Figure 1).

- R² of 0.896
- Log RMSE of 0.478
- Enumerable range of 0.0 – 4.0 Log CFU/mL

Estimations from the SalQuant linear-fit model were compared to MPN based on a 95% confidence interval which demonstrated no differences (Figure 2).



SIGNIFICANCE:

These results demonstrate that complete quantification of *Salmonella* from 0.0 to 4.0 Log CFU/mL can be achieved using the BAX® System Real-Time PCR Assay for *Salmonella*.



REFERENCES:

1. Nayak, R., O'Bryan, C., Kenney, P. B., Crandall, P. G., Ricke, S. 2012. Pre- and post-harvest intervention strategies for controlling *Salmonella* contamination in broiler production. *Salmonella: Classification, Genetics and Disease Outbreaks*. 1-38.

