Salmonella Quantification (SalQuant®) at 1 CFU/g with Hygiena's BAX® System for Raw Chicken Breast

hygiena®

One Health Diagnostics™

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BAX® System Q7 | BAX® System X5 | foodproof® | microproof®

INTRODUCTION:

Not only the presence, but also the level of *Salmonella* in final poultry products has been a growing concern as outbreaks continue to occur and cause illnesses. On May 1, 2024, the U.S. Department of Agriculture's Food Safety and Inspection Service (USDA FSIS) announced their final determination to declare *Salmonella* as an adulterant at levels of 1 CFU/g or higher in non-ready-to-eat (NRTE) breaded stuffed chicken products.

Verification plans from the agency will include testing the incoming components used to produce these NRTE breaded stuff chicken products.

PURPOSE:

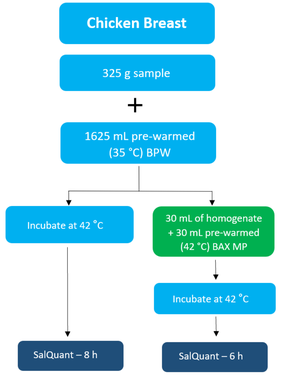
To meet the USDA FSIS policy, a real-time PCR assay was evaluated for the full quantification of *Salmonella* from 1 CFU/g – 10,000 CFUs/g in raw chicken breast destined for not-ready-to-eat (NRTE) breaded and stuffed chicken products.

REGISTERED TRADEMARKS:

METHODS:

Sample Preparation:
Raw, pre-screened negative, chicken breasts were divided into 16, 325 g samples and inoculated with a cold-stressed culture of *Salmonella* from 0.00 – 5.00 Log CFU/g levels. Samples were enriched with 1,625 mL of BPW per the USDA FSIS MLG 4.14. A secondary set of samples was created by transferring 30 mL of the BPW homogenate and combining with equal parts BAX MP media. Both sample sets were incubated at 42 °C for 6-24 hours.

At the same time, a 3-tube x 5-dilution MPN was conducted for each inoculation level following the USDA FSIS Appendix 2.05.



RESULTS:

Curve Development :
- Data was assessed using linear regression to compare the cycle threshold (Ct) and known inoculation levels to create a best fit equation. The fit of the line was assessed using R^2 and Log Root Mean Square Error (RMSE).

325 g samples (Figure 1):
- 8-hour enrichment
- R^2 of 0.91
- Log RMSE of 0.46

30 mL samples (Figure 2):
- 6-hour enrichment
- R^2 of 0.90
- Log RMSE of 0.46

MPN Comparison: Compared to MPN, SalQuant results demonstrated a more accurate Log CFU/g estimation at each inoculation level.

SIGNIFICANCE:

The results of this study demonstrate accurate and rapid quantification of *Salmonella* using the BAX® System SalQuant® assay in raw chicken breast intended for raw breaded stuffed chicken products to meet regulatory requirements of levels as low as 1 CFU/g.

FIGURES:

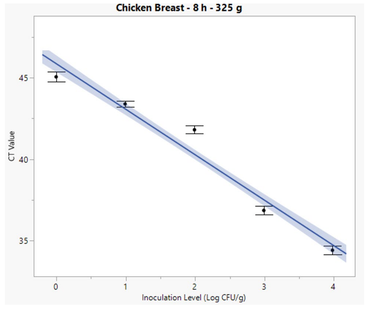
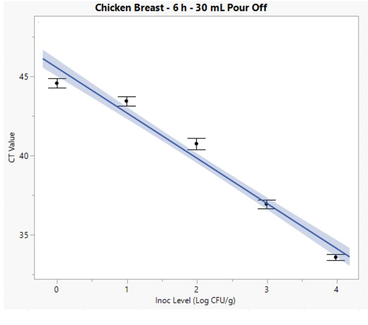


Figure 1 (Left). Mean (*Salmonella* CT) and *Salmonella* CT vs. Inoculated Log CFU/g for 325 g samples

Figure 2 (Right). Mean (*Salmonella* CT) and *Salmonella* CT vs. Inoculated Log CFU/g for 30 mL pour off



REFERENCES:

1. United States Department of Agriculture Food Safety and Inspection Service. Salmonella Not Ready-To-Eat Breaded Stuffed Chicken Products. Docket No. FSIS-2022-0013. Federal Register Vol 89, No. 85. May 1, 2024.