

# Quantification of *Salmonella* from various stages of Poultry Processing

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## Introduction

The USDA's FSIS is driving initiatives to lower the risk of illness caused by *Salmonella* in poultry products by reviewing and improving the practices at slaughter and processing sites. Quantitation of contamination at various stages of poultry production is critical for developing optimized strategies for control of *Salmonella* in the poultry food chain, by enabling the efficacy of controls to be measured.

This study evaluated performance of the Thermo Scientific™ SureCount™ *Salmonella* species, Typhimurium and Enteritidis Multiplex PCR Kit for the quantification of *Salmonella* from poultry production rinses, and finished products.

## Materials and methods

### Sample Preparation

A total of 707 samples were evaluated comprising; 30 mL production environment rinses (n=90), and poultry meat samples (n=617).

### Test Method(s)

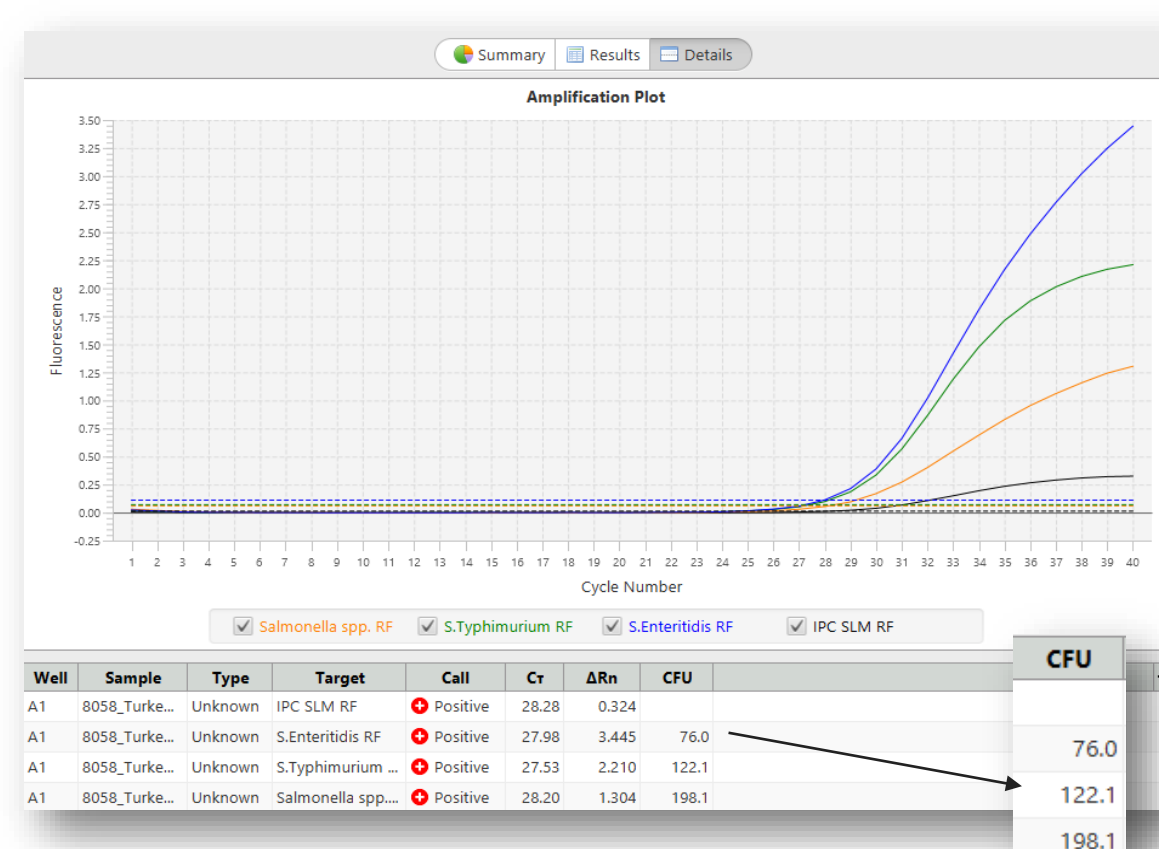
Testing included both naturally and artificially contaminated samples enriched with pre-warmed Buffered Peptone Water, supplemented with novobiocin, prior to testing with PCR.

The relative accuracy was calculated as a percentage of the number of the SureCount *Salmonella* Multiplex PCR workflow results that were within 1.0 log<sub>10</sub> of the initial contamination level (confirmed by artificial contamination or MPN estimation).

### Data Analysis

PCR was conducted using the Applied Biosystems™ QuantStudio™ 5 Real-Time PCR System using the Thermo Scientific™ RapidFinder™ Analysis Software v2.0 or higher. The SureCount *Salmonella* Multiplex PCR Assay, in conjunction with the RapidFinder Analysis Software, generates a CFU / sample for each target (Figure 1).

Figure 1: Amplification plot of the SureCount *Salmonella* Multiplex PCR workflow using the RapidFinder Analysis software



## Results

Figure 2: Relative accuracy of the estimated CFU/sample of the SureCount *Salmonella* Multiplex PCR workflow versus the initial contamination level

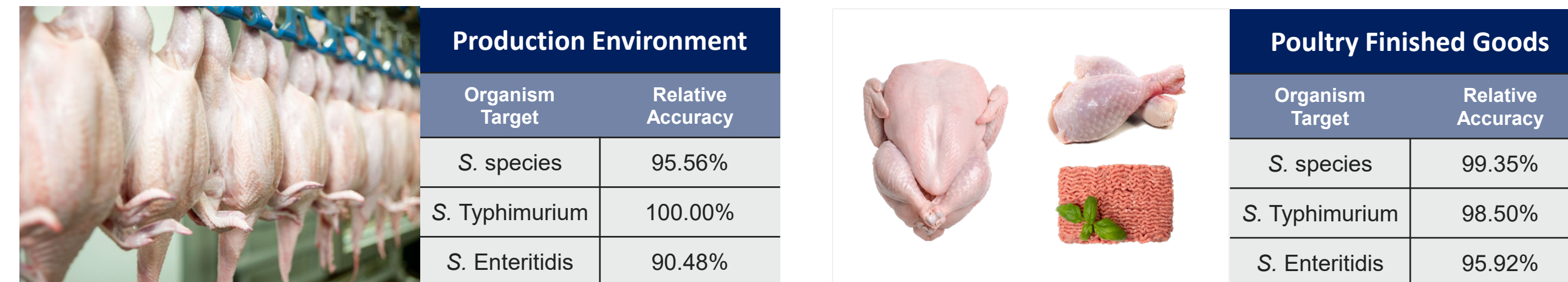


Figure 3: Correlation of the estimated CFU/sample of the SureCount *Salmonella* Multiplex PCR workflow versus the initial contamination level for poultry finished goods

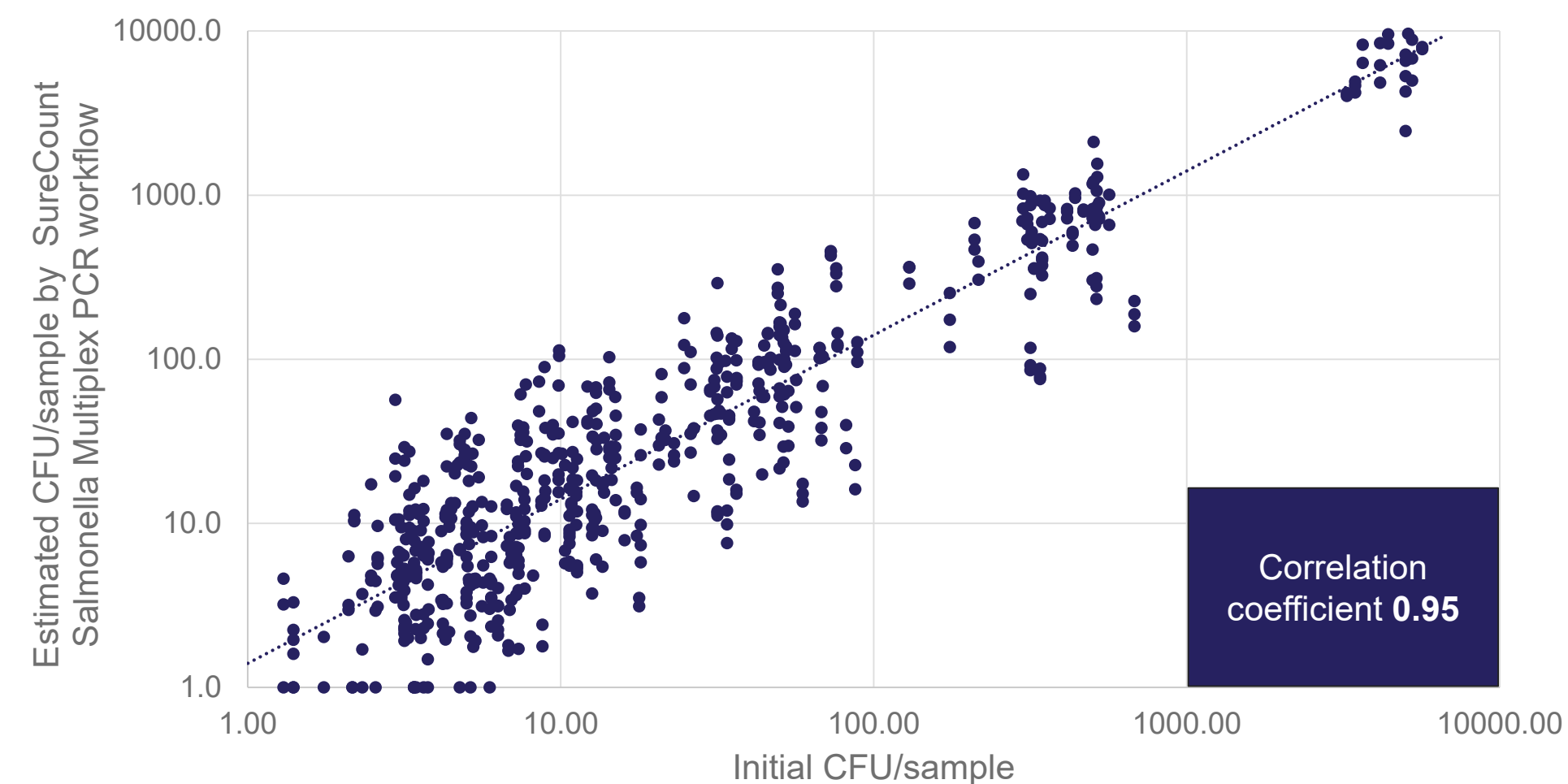
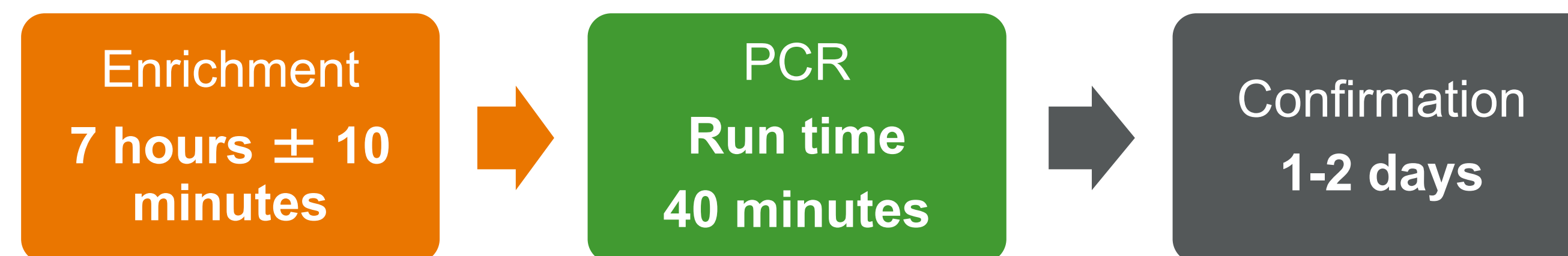


Figure 4: Stages of the SureCount *Salmonella* Multiplex PCR workflow



The SureCount *Salmonella* Multiplex PCR workflow provides a predictive quantitative result for 3 targets in less than 8 hours; shorter than the USDA FSIS 6-day MPN Method for *Salmonella*.

A relative accuracy of >95% was demonstrated for the PCR Assay's *Salmonella* species target (Figure 2) and a correlation coefficient of 0.95 (Figure 3).

Both the relative accuracy and the correlation show that the assay can accurately predict CFU/sample in poultry matrices.

## Conclusions

### Accurate

- The workflow provides accurate estimated CFU/sample for 3 PCR targets.

### Reliable

- The SureCount *Salmonella* Multiplex PCR workflow produces reliable results from samples across different stages of poultry processing

### Easy-to-use

- Results in as little as 8 hours enabling poultry processing decision makers to take action in a timely manner.

## References

- United States Department of Agriculture Food Safety and Inspection Service, Office of Public Health Science, MLG 4.11 Isolation and Identification of *Salmonella* from Meat, Poultry, Pasteurized egg and Siluriformes (Fish) Products and Carcass and Environmental
- United States Department of Agriculture Food Safety and Inspection Service, Office of Public Health Science, Reducing *Salmonella* in Poultry

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