

Introduction:

Poultry is a well-known reservoir of *Salmonella* and processors have been seeking for accurate analytical methods to quickly determine the levels of *Salmonella* in the environment, flocks, and in-plant products in order to mitigate the risk of foodborne illnesses.

Purpose:

Artificial inoculation studies were conducted using specific concentrations of *Salmonella* known to have a negative impact on public health to develop and verify a limits approach (SalLimits™) set at 1 CFU/g (LOD1) and 10 CFU/g (LOD10) as well as quantification of *Salmonella* (SalQuant™) from 1 – 10,000 CFU/g in ground turkey using the BAX® System Real-Time *Salmonella* PCR assay.



<https://www.hygiena.com/salquant>

Experimental Design:

In two separate experiments, ground turkey was divided into 325 g test portions and inoculated with *Salmonella* Heidelberg at 1 CFU/g (LOD1) and 10 CFU/g (LOD10) for a limits approach (n=75) or *Salmonella* Typhimurium at 5 levels (1, 10, 1,000, and 10,000 CFU/mL) for quantification (n=16). Enrichments were prepared according to Figure 1, incubated using shortened enrichment times and tested by Real-Time PCR. Data for limits determination was assessed using qualitative results until all 75 samples were positive. Data for quantification was assessed using linear regression to compare the CT value and Log₁₀ CFU/g.

Results:

SalLimits™ Testing:

- LOD1: 8 hours resulted in the lowest enrichment time for 100% positivity (75/75)
- LOD10: 6 hours resulted in the lowest enrichment time for 100% positivity (75/75)

SalQuant™ Curve Development (Figure 2 & 3):

- 8 hours produced the best linear fit equation with an R² of 0.88 and Log RMSE of 0.53
- Compared to MPN, there were no differences in estimations

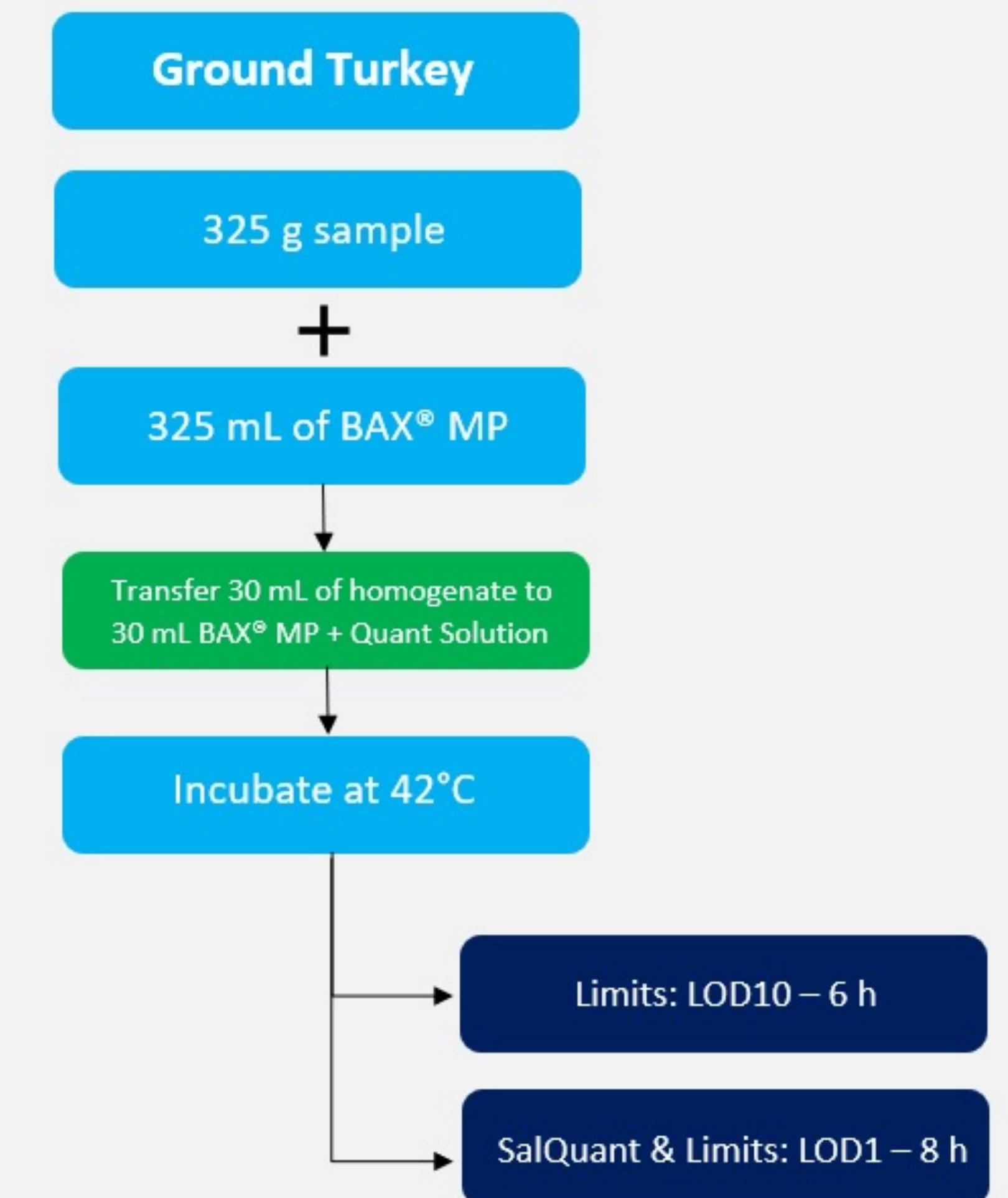


Figure 1. Enrichment protocol for *Salmonella* Limits and *Salmonella* quantification

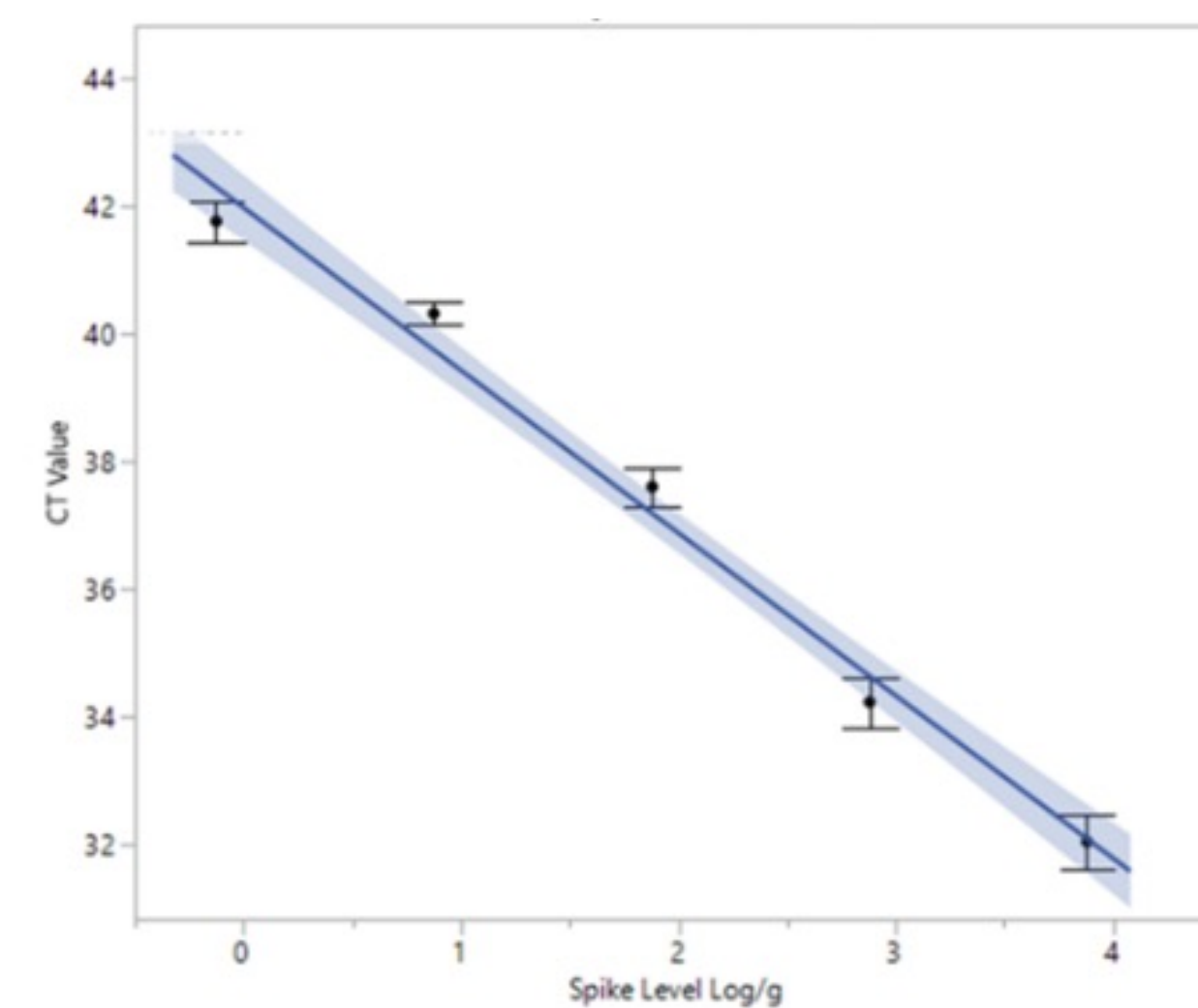


Figure 2. Mean *Salmonella* CT vs. Inoculated Log CFU/g

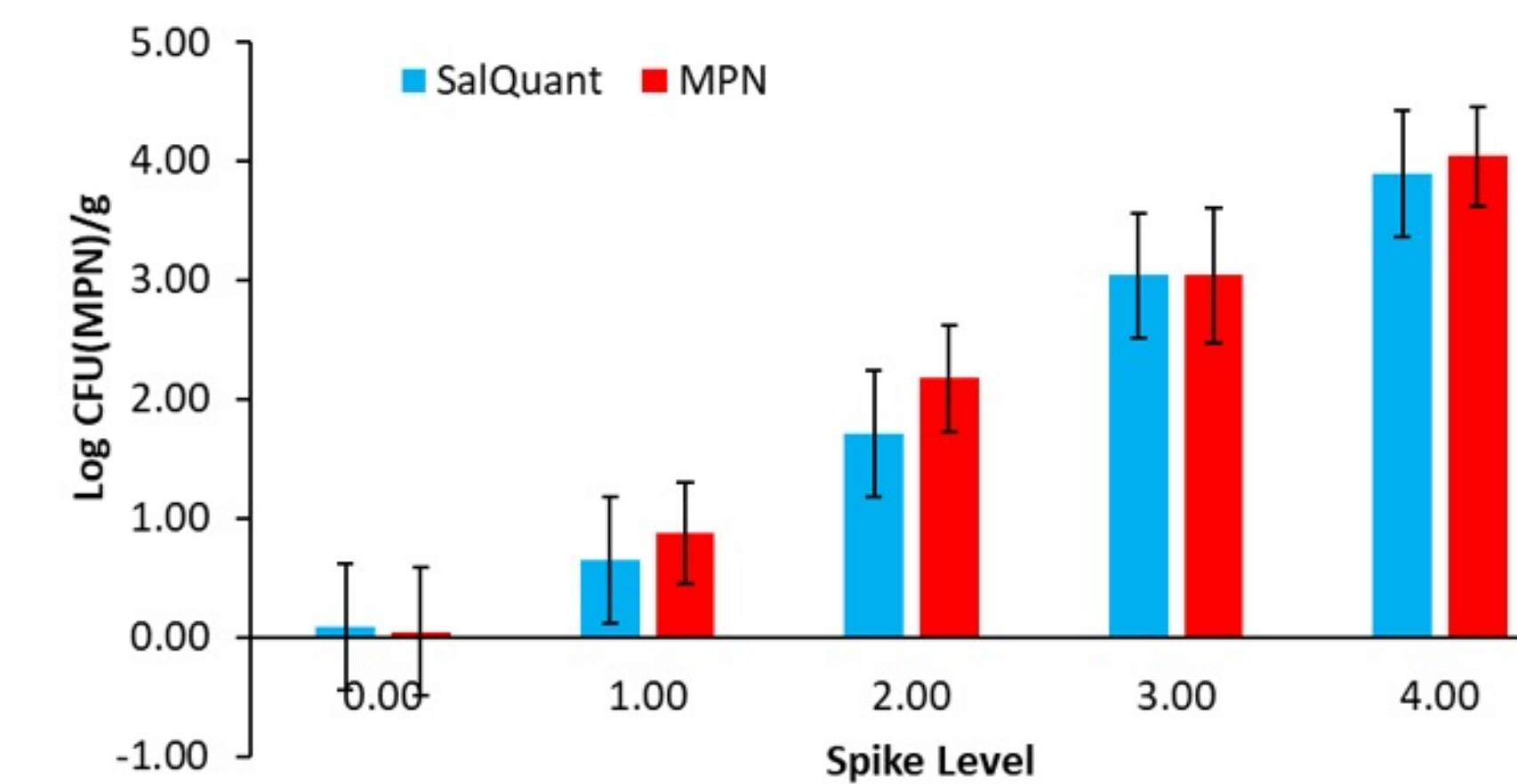


Figure 3. MPN and SalQuant™ comparison per inoculation level at 8 hours

Significance:

These results demonstrate the ability of the BAX® System Real-Time *Salmonella* PCR assay to be used for limits testing to accurately detect 1 CFU/g and 10 CFU/g of *Salmonella* enriched for 8 and 6 hours, respectively. In addition, complete quantification from 1-10,000 CFU/g can be achieved utilizing the same sample at 8 hours.