



A long-term, in-plant analysis of Finalyse SAL bacteriophage applied on parts for grinding.

Case Study

AN EFFECTIVE, TARGETED ANTIMICROBIAL

Finalyse™ SAL bacteriophage is an effective targeted antimicrobial for treating trim and parts prior to grinding. Finalyse SAL targets a wide range of *Salmonella* serovars and is effective against those serovars of highest public health concern. Finalyse SAL is a lytic, non-transducing phage, which destroys the targeted *Salmonella* cell and prevents bacterial resistance or changes in virulence from occurring.

Evaluating antimicrobial treatments applied to parts before grinding provides unique challenges when compared to the typical pre/post efficacy sampling methodology. Pre-treatment parts sampling results are not comparable to ground sampling due to differences in surface area, additional sources of possible *Salmonella* input resulting in greater variation, and sampling methodology.

To address the commercial efficacy and develop an evaluation tool for processors, a commercial case study¹ was conducted to examine the pre-post efficacy of Finalyse Sal applied on parts, as well as a long-term evaluation of the prevalence and load in ground product.

The study objectives were:

1. Demonstrate a reduction in *Salmonella* prevalence and load for parts samples with Finalyse SAL when applied. Determine if historically high *Salmonella* prevalence parts when treated would decrease prevalence when compared to those of the untreated lower prevalence parts.
2. Determine if treating parts with historically higher ground prevalence rates (when included in ground product) shows a meaningful change in ground *Salmonella* prevalence rates as compared to ground samples without the inclusion of treated parts.

METHODOLOGY

In order to determine efficacy of Finalyse SAL, a 90-day validation study was conducted. Finalyse SAL bacteriophage was applied as a dip to previously identified parts with high *Salmonella* ground prevalence rates. High prevalence parts ground rates were used as the treatment group to determine efficacy after phage implementation in comparison to results from ground samples from typically lower prevalence parts as untreated control group.

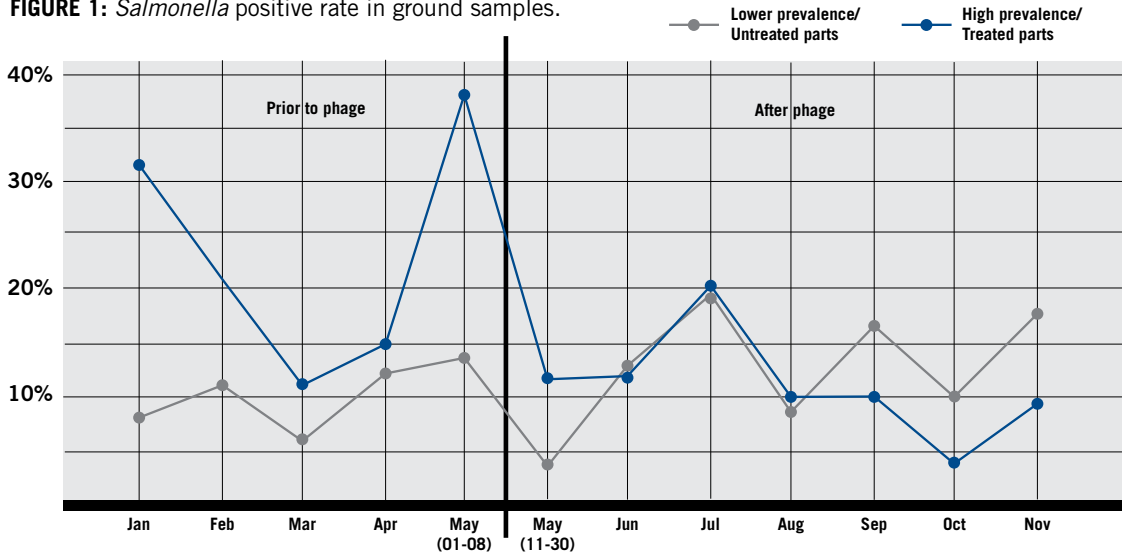
Using the USDA FSIS parts sampling procedure, sample rinsates were tested pre/post application of the Finalyse SAL dip to determine efficacy of Finalyse SAL in reducing *Salmonella* prevalence post application. Part rinse samples collected before phage application had a 17.5% positive rate (22/126), while post-phage samples had a 7.14% positive rate (9/126) showing a statistically significant reduction ($P=0.002$) for parts prevalence post-Finalyse SAL application.

Since ground product is sampled differently from parts and grinding of parts typically results in higher *Salmonella* loads, prevalence and variation, a direct comparison of the pre/post Finalyse treated parts prevalence and ground product prevalence would not be meaningful. Therefore, ground product samples from control (low prevalence untreated parts) and Finalyse SAL (high prevalence treated parts) that were collected as part of routine sampling were used to determine changes in ground *Salmonella* prevalence over time. Due to the typically high variation found in the ground product, this study was conducted for 90 days to determine the difference in prevalence from control and treated parts.

THE PROOF IS IN THE RESEARCH

Results: Figure 1 shows the monthly prevalence rates from routine sampling of ground product from high prevalence parts and untreated parts prior to and after Finalyse SAL implementation for high prevalence parts. Treating these high prevalence parts (blue) showed a decrease in *Salmonella* prevalence after implementation that was not observed for the untreated control parts (grey) over time.

FIGURE 1: *Salmonella* positive rate in ground samples.



Note: The black vertical line represents initiation of Finalyse SAL application to high prevalence parts. This case study was conducted for 90 days; however, the graph above contains several months of baseline data as well as long term routine sampling greater than 90 days. The trend of *Salmonella* prevalence reduction from treating high prevalence parts with Finalyse SAL continues post 90 days as evidenced by the graph above.

This long-term evaluation of Finalyse™ SAL when applied to parts allowed for average impact on prevalence to be isolated from the potential impacts of additional sources of variation in ground prevalence. These results would not have been evident if a shorter [1 week] study had been conducted due to potential variation from week and seasonal trends. This long-term case study (90 days) allowed attribution over time, resulting in visibly reduced prevalence in both the parts/trim and the treated ground product.

CONCLUSION

Finalyse SAL can be used as a targeted antimicrobial approach for controlling *Salmonella* when treating parts used for ground product. In-plant comparison of treating higher prevalence parts with Finalyse SAL provided meaningful evidence for the efficacy of Finalyse SAL in altering (decreasing) ground prevalence *Salmonella* rates*. This case study demonstrates the efficacy of treating parts and trim with Finalyse SAL for reducing ground product prevalence as part of a multi-hurdle, pathogen control program, resulting in an overall safer product.

*Since the effectiveness of Finalyse SAL was established in ground product, all parts can now be treated for even greater *Salmonella* reductions in the ground product. However, when treating all parts, evaluation of efficacy in ground product can only be compared to historical prevalence rates since an untreated contemporary comparison is not available; pre and post parts testing is still possible to validate efficacy in reducing parts load and prevalence.



To learn more about Finalyse SAL contact your ARM & HAMMER™ representative or visit AHfoodchain.com.

1 ARM & HAMMER customer validation. Data on file. 2021.