

# Finalyse Reduces *Escherichia coli* O157:H7 on Cattle Hides in Five Minutes<sup>1</sup>

## PURPOSE

In a third-party validation study, a commercial beef packer wanted to determine the optimum exposure time and efficacy of bacteriophage against *Escherichia coli* (*E. coli*) O157:H7 on cattle hides.

## EXPERIMENTAL DESIGN

Finalyse® bacteriophage was tested on 30 pieces of 4 x 4 inch raw cattle hides that were received from a commercial cattle packer.

Five strains of *E. coli* O157:H7 obtained from the Silliker Food Science Center Culture Collection were used in the testing. The purity of each strain of *E. coli* O157:H7 was verified by streak plating on eosin methylene blue. The plates were incubated for 24 hours at 35°C. Typical colonies were considered confirmatory. Each strain was serologically confirmed for the O157 and H7 antigens. The inoculum was applied to the hide patches at 1.0x10<sup>5</sup> CFU/mL.

Titer of Finalyse bacteriophage was verified at the initiation of the study. The methods used to determine the titer of the product were provided by the third-party laboratory. Final concentration was delivered to the hide patch at commercially applied levels.

### The experiment included:

- *E. coli* O157:H7
- Test parameters
  - Finalyse bacteriophage mixtures
  - Control diluent (negative control)
- Process: Spray application of bacteriophage mixtures
- Sampling plan
  - 5 minutes post-application
  - 1 hour post-application
  - 4 hours post-application

## SAMPLE COLLECTION AND PROCESSING

Samples were aseptically removed from the petri dishes and combined with 100 mL of Butterfield's phosphate buffer. Each bag was shaken vigorously for one minute. Subsequent 10-fold dilutions were made in 9 mL Butterfield's phosphate buffer. Samples were analyzed by the pour plate technique using trypticase soy agar with violet red bile agar (VRBA) overlay. The incubation time was 48 hours at 35°C. The appearance of typical colonies was considered confirmatory.

## DATA

**Table 1. Counts of *E. coli* O157:H7 on cattle hides when treated with control (phosphate buffer) vs. Finalyse**

| Exposure Time | Control<br>Avg. Log CFU/g | Finalyse<br>Avg. Log CFU/g | <i>E. coli</i> Reduction<br>Avg. Log CFU/g |
|---------------|---------------------------|----------------------------|--|
| 5 minutes     | 5.34                      | 3.54                       | 1.8  |
| 1 hour        | 5.58                      | 3.66                       | 1.92                                       |
| 4 hours       | 6.12                      | 3.54                       | 2.58                                       |

## RESULTS

The Finalyse titer level applied to the beef hide patches was 1.4x10<sup>7</sup> PFU/mL. Finalyse was proven efficacious with a reduction >1.8<sub>Log</sub> CFU/g at an exposure time of five minutes. The control and Finalyse data results are reported as an average of triplicate testing, further highlighting Finalyse's consistency.

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<sup>1</sup>Ceylan, E. 2016. "Determination of Reduction of *Escherichia coli* O157:H7 by Different Bacteriophage Mixtures on Cattle Hides." Silliker Food Science Center Report. RPN 18266: Merieux NutriSciences.

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