

# Research Notes

Arm & Hammer Animal and Food Production



## Finalyse proven more effective against *E. coli* O157:H7 than Ecolicide.

### STUDY OVERVIEW<sup>1</sup>

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

Two bacteriophages—Finalyse™ and Ecolicide®—were 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 ethylene 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  $1.0 \times 10^5$  CFU/mL.

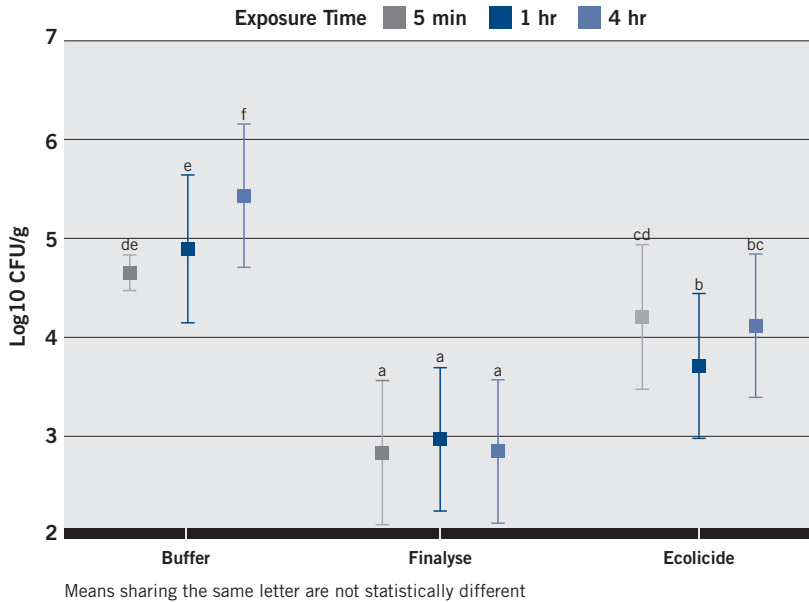
Titers of Finalyse bacteriophage and Ecolicide bacteriophage were verified at the initiation of the study. The methods used to determine the titer of the product were provided by the third-party laboratory. Final concentration was delivered to the hide patch at commercially applied levels.

The experiment included:

- *E. coli* O157:H7
- Test parameters
  - Finalyse bacteriophage mixtures
  - Ecolicide bacteriophage
  - Control diluent (negative control)
- Spray application of bacteriophage mixtures
- Sampling plan
  - 10-15 minutes post-application
  - 1 hour post-application
  - 4 hours post-application
- Two replicate samples per pull time for each parameter

Samples were aseptically removed from the Petri dishes and combined with 100 mL of Butterfield's phosphate buffer. Each sample 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 overlay. The incubation time was 48 hours at 35°C. The appearance of typical colonies was considered confirmatory.

**Figure 1:** Comparison of counts of *E. coli* O157:H7 on cattle hides when treated with Finalyse and Ecolicide



## RESULTS

The Finalyse™ titer level applied to the beef hide patches was  $1.4 \times 10^7$  PFU/mL. The Ecolicide® titer level was  $9.0 \times 10^9$  PFU/mL. Finalyse was proven more effective against *E. coli* O157:H7 than Ecolicide. Finalyse had an average reduction of  $>1.8_{\text{Log}}$  CFU/g at an exposure time of five minutes, while Ecolicide had an average reduction of  $>0.47_{\text{Log}}$  CFU/g. Because some cattle have a limited dwell time, Finalyse offers a clear advantage in reducing *E. coli* regardless of dwell time.



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1 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.