Research Notes

Passport Food Safety Solutions

Finalyse reduces *Escherichia coli* O157:H7 on cattle hides in five minutes[1]

STUDY OVERVIEW

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.

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 $1.0x10^5$ 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 in replicate
  - 5 minutes post-application
  - 1 hour post-application
  - 4 hours post-application

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.

RESULTS

The Finalyse titer level applied to the beef hide patches was $1.4x10^7$ PFU/mL.

TABLE 1	Counts of *E. coli* O157:H7 on cattle hides when treated with control (phosphate buffer) vs. Finalyse		
Exposure time	**Control** Avg. Log CFU/g	**Finalyse** Avg. Log CFU/g	***E. coli* Reduction** 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

CONCLUSION

Finalyse™ was proven efficacious with a reduction >1.8_{Log} 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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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.