

Publication abstract

Efficacy of bacteriophage in controlling *E. coli* STEC O157 populations on raw beef

Based upon:

“Efficacy of bacteriophage and organic acids in decreasing STEC O157:H7 populations in beef kept under vacuum and aerobic conditions: A simulated High Event Period scenario”

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A High Event Period (HEP) refers to the production interval when beef processing facilities in the U.S. experience increased contamination with *Shiga toxin-producing Escherichia coli* (STEC). While traditional organic acids like lactic and peroxyacetic acids are often used for decontamination, bacteria may develop resistance. A study conducted by the University of Nevada in the United States of America evaluated the effectiveness of bacteriophage (phage) product [Phageguard E \(PGE\)](#) in reducing *E. coli* O157 contamination on beef and to assess their effectiveness compared to organic acids under vacuum and aerobic conditions.

Trial setup

Four strains of *E. coli* O157 were inoculated onto beef samples to simulate contamination. Samples were prepared under two packaging conditions: vacuum and non-vacuum environments, mimicking beef industry practices. Samples were treated and observed over two time intervals, 30 minutes and 6 hours, to assess the antimicrobial efficacy in reducing *E. coli* loads. Reduction levels were statistically analyzed to compare the efficiency of bacteriophages and organic acids.

Conclusion

Bacteriophage applications led to a substantial reduction in *E. coli* O157 contamination on beef. Under vacuum conditions, reductions of 1.07 log at 30 minutes and 1.41 log at 6 hours were achieved. In aerobic conditions, a maximum of 1.41 log reduction was observed. The study concluded that bacteriophage treatments are more effective than the tested organic acids in reducing *E. coli* contamination in vacuum-packaged beef, offering a promising alternative for controlling STEC O157 in beef during High Event Periods (HEP) in processing facilities.

1.41_{log}
Reduction

E. coli O157 reduction under vacuum conditions

Bacteriophage application under vacuum conditions reduced *E. coli* O157 contamination on beef up to 1.07 log after 30 minutes, and up to 1.41 log after 8 hours.

1.41_{log}
Reduction

E. coli O157 reduction under aerobic conditions

Bacteriophage application under aerobic conditions reduced *E. coli* O157 contamination on beef up to 1.41 log after 8 hours.

