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Bio-control of shiga toxin producing *Escherichia coli* (STEC) O157: H7 contaminated in raw beef by using a lytic bacteriophage

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Introduction: Shiga toxin-producing *Escherichia coli* (STEC) are dangerous foodborne pathogens usually transmitted to human through raw or undercooked meats. Lytic bacteriophages or phages have recently emerged as the natural agents for controlling of STEC contamination in meats.

Purpose: The objectives of this study are to isolate lytic bacteriophages for STEC O157:H7 and to use them as the agents for controlling of these bacteria in raw beef.

Methods: The lytic phages were isolated from bovine intestine samples by using the double layer technique with *E. coli* O157 as the hosts for phage propagation. The phage with widest lytic range was further characterized and used for inactivation of STEC O157 : H7 artificially inoculated in raw beef samples at $5x10^5$ CFU/piece at 25° C. The survival viable cells were then enumerated after 2, 4, 6 and 24 h incubation for comparing the differences between control and phage-treated samples.

Results: The phage PE37 belonging to the non-*stx* gene member of the Myoviridae family was successfully isolated. The lytic range tests revealed that the PE37 lysed all 37/37 (100%) tested STEC O157 : H7 strains from human illness. At 25°C, the treatment of 10 raw beef pieces with the PE37 at 2, 4, 6 and 24 h significantly reduced the concentration of STEC O157:H7 by 1.43, 1.55, 1.58 and 3.1 log CFU/piece, respectively compared to phage-free control (P<0.05).

Significance: The results from present study implicate that phage PE37 has potential characteristics applicable to controlling of STEC O157:H7 contamination in raw meats.

Biography

Hoang Minh Son has completed his Masters' degree in Department of Bioscience and Biotechnology, Faculty of Agriculture, Kyushu University in 2010. Currently, he is pursuing PhD on controlling of Shiga toxin-producing Escherichia coli contamination to raw meats. He has published one paper in *Journal of Microbiology and Immunology*.

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