

## **Asian Applied Microbiology 2021: The Use of Bacteriophages for Decontamination of Experimentally Contaminated Chicken Breast Meat- N. Tamarashvili, G. Eliava Institute of Bacteriophages, Microbiology and Virology, 0160, Tbilisi, Georgia**

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### **Abstract**

#### Introduction

Enteric Salmonella infection is a global problem both in human and animals, and has been attributed to be the most important bacterial etiology for enteric infections worldwide with massive outbreaks occurring in recent years. Poultry products are considered one of the major sources of Salmonella infections. In many cases multiresistant bacteria infecting humans have been directly linked to resistant organisms in animals. Existence of such pathogens is problematic because of possible transmission of antibiotic resistant bacteria from animals to humans through the food supply. The development of alternative anti-microbial remedies has become one of the highest priorities of modern medicine and biotechnology. One of such alternatives might be bacteriophages as a prospective biocontrol method against contaminations caused by antimicrobial resistant pathogens.

**Aim:** This work was conducted to study the efficacy of bacteriophage cocktail for reduction of contamination in chicken breast meat, on the model of artificial contamination with *S. typhimurium*.

#### Materials and Methods

Chicken breasts fillet were aseptically cut into  $10 \pm 0.5$  g sample size. The sliced samples were transferred into sterile containers. A total of 45 random samples were enrolled in our work. The samples were divided into three groups (A, B and C). Samples from A and B groups were inoculated with 100  $\mu$ L ( $2.2 \times 10^4$  CFU/mL) of the bacterial suspension and incubated at room temperature for 10 min to allow bacterial attachment to the meat surface. Then, 1 ml phage cocktail (combination of three phages in an equal ratio) at  $10^5$  PFU/ml and  $10^8$  PFU/ml were separately pipetted onto the samples from the A and C groups. B group - chicken breast samples only treated with *S. typhimurium* at levels of 104 CFU/ml without phage treatment were used as positive controls and C group - samples not inoculated

with *S. typhimurium* and only inoculated with phage cocktail were used as negative controls, respectively. The prepared samples were stored at 25°C for 1 h and 24 h. At each sampling time, the samples were taken and stomached for 2 min after the addition of 20 mL of phosphate buffer. After the dilutions were prepared, the samples were analysed to determine viable bacterial counts (CFU/ml). Bacterial counts were determined by triplicate plating.

### Results

After bacteriophage cocktail treatment of the chicken meat, experimentally contaminated with *S. typhimurium*, a significant reduction of contamination was observed. Overall, phage application at 108 PFU/ml reduced Salmonella by 3.8 log CFU/ml (control = 6.8 log CFU/ml, 108 PFU/ml = 3 log CFU/ml) after 1 h and 4 log CFU/ml reduction of Salmonella was after 24 h (control = 8 log CFU/ml, 108 PFU/ml = 4 log CFU/ml), whereas, applications at 105 PFU/ml reduced 0.6 log CFU/ml (control = 5.2 log CFU/ml, 105 PFU/ml = 4,6 log CFU/ml) after 1 h and 2,2 log CFU/ml (control = 6 log CFU/ml, 105 PFU/ml = 3,8 log CFU/m) after 24 h, respectively.

### Conclusion

These data suggest that bacteriophages can be successfully used to reduce food-borne pathogen contamination in food chain.