Thermal Stabilities of Foodborne Pathogen *Salmonella enterica* serovar Thompson and Bacteriophage ΦEnt

Abstract

Salmonella are a group of bacterial pathogens frequently causing foodborne illness. Effective control of *Salmonella* is important to improve food safety. Bacteriophages or phages (viruses that attack bacteria) have emerged as promising biocontrol agents against bacterial pathogens. To effectively use phages to control *Salmonella*, the thermal stabilities of both *Salmonella* and phages need to be investigated. The objective of this study is to evaluate the thermal stabilities of *Salmonella enterica* serovar Thompson and phage ΦEnt (attacking the *Salmonella*) at various temperatures.

The thermal stabilities of *S*. Thompson and ΦEnt were measured in water baths at 37, 50, 63, and 72°C. Samples were taken at 0.5, 1, 2, 3, and 4 minutes. Cell and phage concentrations were estimated using plate count method and plaque assay, respectively. The results showed that *S*. Thompson and ΦEnt were stable at 37°C. At 50°C, cell concentration remained unchanged while phage concentration decreased about 1.5 log units within 1 min and slightly decreased thereafter. At 63°C, cell concentration decreased 1-log unit within 1 min, and dropped below the detection limit within 3 min. In contrast, phage concentration decreased 2.5 log units within 30 sec, and decreased slowly thereafter. At 72°C, cell concentration quickly dropped below the detection limit within 30 sec while phage concentration decreased much slower.

In conclusions, the thermal stabilities of *Salmonella* Thompson and phage ΦEnt vary with the temperature over the time. The study provided valuable data for the application of phage ΦEnt as a biocontrol agent against *Salmonella* Thompson at various temperatures.