091-AGR

High-Pressure Processing, Mild Heat, and Carvacrol for Inactivation of Non-Typhoidal *Salmonella* Serovars in Buffered Environment

Introduction: First reported more than a century ago, nontyphoidal *Salmonella* serovars are still the leading cause of food borne hospitalizations and deaths in the United States.
Purpose: The purpose of current study is to investigate the impact of elevated hydrostatic pressure at 4.4 and 60.0 °C in presence of 0.2% (v/v) carvacrol for inactivation of non-typhoidal *Salmonella* serovars in buffered environment (PBS) and ground poultry.
Methods: A four-strain validated mixture of nontyphoidal *Salmonella* and a strain of *S.* Tennessee were exposed to elevated hydrostatic pressures of 350 and 650 MPa for 0 (control), 3, 5, and 10 minutes at temperatures of 4.4 and 60 °C with and without 0.2% carvacrol. Treatments were conducted in PULSE tubes inside the chamber of Hub880 Barocycler unit. Temperatures were adjusted using a stainless-steel jacket connected to a circulating water bath. Data were statistically analyzed at type I error level of 5% using Tukey-adjusted ANOVA. Additionally, linear (D-value) and non-linear (kmax) inactivation indices were calculated.

Results: Combination of mild heat (at 60.0 °C), low concentration of carvacrol (0.2%), and mild pressure (350 MPa) resulted in > 5.0 log CFU/mL reduction ($P < 0.05$) of *Salmonella* serovars, surpassing the log reductions obtained by the current high-pressure processing industry standard of 650 MPa. Selected strain mixture and *Salmonella* Tennessee exhibited comparable ($P \geq 0.05$) sensitivity to pressure-based treatments with D-values (350 MPa/4.4 °C) of 9.43 and 8.22 min, respectively. These values were reduced ($P < 0.05$) to 4.37 and 4.15 min, respectively with the addition of 0.2% carvacrol.

Significance: Application of mild heat at 60.0 °C and low concentration of carvacrol (0.2%) showed microbiologically important synergism for augmenting the decontamination efficacy of high-pressure processing. Additionally, *Salmonella* Tennessee, an epidemiologically important serovar, illustrated comparable sensitivity to the 4-strain mixture of non-typhoidal *Salmonella* and thus could be used interchangeably in future public health microbiology validation studies.