Biosketch

Rukma Reddy received his Ph.D. degree from Utah State University. Guy Skinner received his Ph.D. degree from the University of Georgia. They both joined FDA at the start of National Center for Food Safety and Technology and have been lab partners ever since. Their research expertise is in the area of inhibition and control of Clostridium botulinum in low-acid shelf-stable and extended shelf life refrigerated food products.

Abstract

This presentation covers the brief overview of Clostridium botulinum types and their associated outbreaks, and inactivation kinetics of most resistant spores of Clostridium botulinum exposed to combinations of high pressures and temperatures. These resistant strains were selected by screening 31 strains of type A and proteolytic type B C. botulinum. Resistance of spores of selected C. botulinum strains (Giorgio-A and 69-A) was compared with the resistance of Clostridium sporogenes PA3679 spores. Proteolytic type B strains were less resistant compared to resistance of type A strains to processing at a high pressure and temperature (105°C and 700 MPa) combinations. C. botulinum strains Giorgio-A, 69-A, and C. sporogenes PA3679 spores demonstrated decreased resistance as the process temperature increased from 93 to 108°C. High pressure had little or no effect on resistance of Giorgio-A and 69-A, and C. sporogenes PA3679 based on D-values and range of pressures (600-750 MPa) tested. Pressure-assisted D-values of C. sporogenes PA3679 at 108°C and various pressures were higher than the selected C. botulinum strains. Thermal D-values were higher for Giorgio-A, 69-A, and C. sporogenes PA3679 at any temperature compared to those processed at the same temperature combined with pressure. This implies that pressure does assist in the inactivation of C. botulinum spores, but not within the range of pressure tested here. Based on the thermal and pressure-assisted D-values, C. sporogenes PA3679 reported to be more resistant than C. botulinum strains, Giorgio-A and 69-A. Details on the inactivation kinetics of C. botulinum strains in comparison with C. sporogenes PA3679 will be presented.