4th ISEKI-Food E-conference

Food Texture, Quality Safety and Biosecurity
in the Global Bioeconomy

Book of Abstracts

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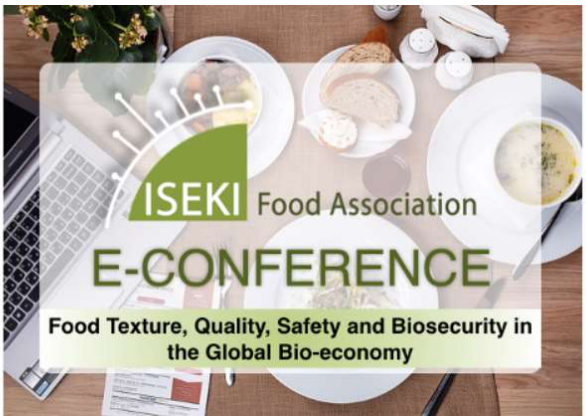
ISEKI Food Association



BOOK OF ABSTRACTS

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HIGH-PRESSURE PROCESSING AND LYTIC BACTERIOPHAGE COCKTAIL PHAGEGUARD S AS A SYNERGISTIC HURDLE SYSTEM TOWARDS SALMONELLA INACTIVATION IN EGG WHITE

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Salmonella spp. still represents a major public health concern as the etiological agent of foodborne diarrhoeal illnesses. Salmonella Enteritidis is the most common serovar associated with non-typhoidal salmonellosis in the United States and Europe, through the ingestion of raw, undercooked eggs or egg-derived food products. The consumption pattern has changed worldwide, towards a growing demand for minimally processed foods. The association of emerging technologies with conventional antimicrobial agents has been scarcely exploited as a feasible multi-hurdle decontamination approach. The purpose of the present work was to develop a novel non-thermal technology through the combination of mild high pressure processing (HPP, 300 MPa) with the bacteriophage PhageGuard S towards a 4-strain *Salmonella* cocktail inactivation in egg white. A preliminary set of experiments allowed to establish the most adequate parameters to be employed in the proposed system. Concerning the HPP (200 to 600 MPa) resistance pattern of thirteen food and clinical *Salmonella* strains belonging to serovars *Enteritidis, Typhimurium* and *Senftenberg*, a prominent intrastrain heterogeneity was observed and as expected, higher pressure magnitudes elicited a lower survivability. Regarding the impact of the pressure processing on the egg white viscoelastic profile, it was found that from 400 MPa onwards the complex viscosity and elastic modulus

increased noticeably. The second part of the work sought to investigate the decontamination potential of the proposed treatment.

In the challenge assays performed in egg white comprising a high bacterial load (107 CFU mL-1), HPP per se was not able to accomplish a prominent bactericidal effect, whilst the combination with the bacteriophage elicited *Salmonella* inactivation to values below the detection limit. The association of the two hurdles was determined to be a synergism. Moreover, a scarce impact on the physical features of egg white – color, foaming capacity and rheological properties - was observed throughout the 7-day refrigerated storage (4ºC). To our knowledge, this is the first study documenting a sustainable non-thermal technology as a suitable alternative to egg white pasteurization since the synergistic system HPP-PhageGuard S accomplished a Salmonella 5-log reduction.

Keywords: *Salmonella enterica* cocktail, High Pressure Processing, PhageGuard S, hurdle technology, synergistic system