IFSH Seminar Series
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11:30 AM – 12:30 PM
Bldg. 91, Room 216, Moffett Campus

Elena Enache, Ph.D.
Senior Scientist, Microbiology
Science Operations
Grocery Manufacturers Association

"Development of a Dry Inoculation Method for Thermal Challenge Studies in Low-Moisture Foods by Using Talc as a Carrier for *Salmonella* and a Surrogate (*Enterococcus faecium*)"

Biosketch

Dr. Elena Enache earned her Ph.D. in microbiology from the Institute of Biological Sciences – Central Institute of Biology, Bucharest, and her MS in microbiology and immunology from University of Bucharest, Romania. She is a laureate of "Emanoil Teodorescu Prize" of the Romanian Academy for Biology (1986) (the highest scientific distinction in Romania, given once in a lifetime). In her role as Senior Scientist, Microbiology, Science Operations for the Grocery Manufacturers Association, Dr. Enache is responsible for proposals, design, and coordination of research programs based on organizational strategic plans to support science-based regulatory policies and consumer confidence and provide technical supports to stakeholders. The following research projects were recently finalized and published and/or draft manuscripts are in progress: "Thermal Inactivation and Survival of Salmonella in Food as a Function of Water Activity and Fat Level", "Heat Resistance of Histamine-Producing Bacteria in Irradiated Tuna Loins", and "Growth of *Staphylococcus aureus* and Enterotoxin Production in Pre-Cooked Frozen Tuna Meat Held at 21 or 27°C". Previous research projects include survival or heat resistance studies of the vegetative pathogens or spoilage organisms in different food products.

Abstract

The objective of this study was to obtain dry inocula of *Salmonella* Tennessee and *Enterococcus faecium*, a surrogate for thermal inactivation of *Salmonella* in low-moisture foods, and to compare their thermal resistance and stability over time in terms of survival. Two methods of cell growth were compared: cells harvested from a lawn on tryptic soy agar (TSA-cells) and from tryptic soy broth (TSB-cells). Concentrated cultures of each organism were inoculated onto talc powder, incubated at 35˚C for 24 h, and dried for additional 24 h at room temperature (23 ± 2˚C) to achieve a final water activity of ≤ 0.55 before sieving. Cell reductions of *Salmonella* and *E. faecium* during the drying process were between 0.14 and 0.96 log CFU/g, depending on growth method used. There was no difference between microbial counts at days 1 and 30. Heat resistance of the dry inoculum on talc inoculated into a model peanut paste (50% fat and 0.6 water activity) was determined after 1 and 30 days of preparation. For *Salmonella*, there was no significant difference between the thermal resistance (D85˚C) for the TSB-cells and TSA-cells (e.g. day 1 cells D85˚C = 1.05 and 1.07 min, respectively), and there was no significant difference in D85˚C between dry inocula on talc used either 1 or 30 days after preparation ($P > 0.05$). However, *E. faecium* yielded different results: the TSB-grown cells had a significantly ($P < 0.05$) greater heat resistance than TSA-grown cells (e.g. D85˚C for TSB-cells = 3.42 min versus 2.60 min for TSA-cells). *E. faecium* had significantly ($P < 0.05$) greater heat resistance than *Salmonella* Tennessee regardless what cell type was used for dry inoculum preparation; therefore, it proved to be a conservative but appropriate surrogate for thermal inactivation of Salmonella in low-moisture food matrices under the tested conditions.