IFSH Seminar Series
Thursday, July 2, 2015
11:00 AM – 12:00 PM
Bldg. 90, Room 100, Moffett Campus

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"Quantifying Sources of Error in *Salmonella* Thermal Inactivation Models for Meats and Low-Moisture Foods"

Biosketch

Ian Hildebrandt is a biosystems engineer, obtaining both his B.S. and his Masters degrees from Michigan State University. Beginning in 2009, Ian has been studying thermal inactivation kinetics of pathogens (most notably *Salmonella*) and how to best model/predict inactivation in scaled-up processes. During his time at MSU, he devoted his time to studying how experimental methods, and not experimental treatments, impact the measurement of thermal resistance. Additionally, he was involved with several collaborative projects aimed at better understanding and disseminating research, teaming up with members of the USDA-FSIS, Washington State University, and ComBase. He most recently began working with the FDA at IFSH (April, 2015) as an ORISE fellow. His research interests are quantifying sources of error in experimental and modeling methods in *Salmonella* thermal inactivation experiments and applying laboratory-based scientific research to pilot-scale processes.

Abstract

Despite an incomplete understanding of the impact of experimental methodologies on resulting *Salmonella* thermal inactivation models, thermal resistance data and parameters continue to be generated, reported, and presumably applied to food safety analyses. Therefore, the objectives were to: (1) evaluate the impacts of varied experimental methods on the observed thermal resistance of *Salmonella*, (2) investigate the effects of substantively similar thermal inactivation methods on the quantification of *Salmonella* thermal resistance, and (3) investigate the effects of regression methods on the estimation of *Salmonella* thermal resistance parameters and their associated errors. These objectives were accomplished with two cross-laboratory comparison studies. The first study evaluated the effects of two *Salmonella* inactivation methods in ground beef on the resultant inactivation kinetics, based on data generated by two different laboratories. The two methods used yielded characteristically different *Salmonella* inactivation kinetics, regardless of the laboratory. The second study investigated the effects of five different inoculation methods on the subsequent stability and thermal resistance of *Salmonella* in wheat flour, and the repeatability of those results, based on data generated by two different laboratories. These methods yielded significantly different *Salmonella* thermal resistances, and only two yielded repeatable initial *Salmonella* populations and subsequent thermal resistances. Overall, thermal inactivation methods significantly impacted *Salmonella* thermal resistance in both meat and low-moisture food matrices.