Arisara Boonyawantang 2012: Mathematical Modeling for Survival and Growth of *Vibro parahaemolyticus* in Processed White Prawn. Master of Science (Food Engineering), Major Field: Food Engineering, Department of Food Science and Technology. Thesis Advisor: Assistant Professor Waraporn Boonsupthip, Ph.D. 79 pages.

Vibrio parahaemolyticus has been a major cause of human gastroenteritis associated with the consumption of seafood. The objective of this investigation was to understand the behavior and identify predictive cellular-number model of this pathogen in prawn over the ambient-to-freezing temperature range. The survival and growth of *Vibro parahaemolyticus* BCC 24339 on white prawn at difference temperature (-20 to 44 °C) were determined. It was found that at the temperature range of -20 and 10 °C the microbial number decreased over time. On the other hand, at the temperature range of 15 and 44 °C the microbial number increased. The modified Gompertz and Baranyi models produced good fits to the observed survival and growth curves of the pathogen (R^2 = 0.962 and 0.954, respectively). The effect of storage temperature on the specific growth rate (μ_m), Asymptote (A) and lag phase (λ) was modeled by Kohler, modified Ratkwosky, Asymptote temperature and non-linear Arrhenius equations, respectively. The model fitting was based on two approaches, separatating and combininating approaches. The former approach was to divide while the later was to combine the experimental data of both decreasing and growth periods in the process of the model fitting. The results showed that both the separating and combining approaches provided similar prediction quatities of the pathogenic number. However, the separating approach required the growth T_{min} to be 6.4 °C, which conflicted with the experimental death at 10 °C. On the other hand, the combiniation approach generated the realistic value of 10.1 °C. Moreover, the growth T_{min} was equal to the survival T_{max} which generated continuity of the temperature-dependent equations. The results showed that the combining approach provided good predictions for *V. parahaemolyticus* BCC24339 on prawn (R^2 = 0.924 and RMSE = $\pm$0.300 (logMPN/g)). Predicting the survival and growth under unsteady state in processing frozen shrimp showed that the equation developed predict growth or survival developed predict growth or survival on processed white prawn at test temperatures agreed well with observed in processing. This new approach can excellently explain the effects of temperature on the growth and survival behavior of *V. parahaemolyticus* BCC 24339 on prawn. It can be an effective tool in assessing either safety or risk of prawn consumption.

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