Comparison of Primary Models and Development of Predictive Model for Growth of *Listeria monocytogenes* in Sausage

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Abstract: *Listeria monocytogenes* can grow at low temperatures such as refrigeration. Accordingly, *L. monocytogene* is one of the major food poisoning pathogens in chilled food. This study was aimed to compare three primary models (the modified Gompertz, Logistic, and Baranyi model) and develop predictive models for the growth of *L. monocytogenes* in sausage, which is the most popular processed meat product, as a function of storage temperature (25, 30 and 35 °C). The growth data obtained at different temperatures were fitted into the modified Gompertz, Logistic, and Baranyi model to compare the goodness-of-fit using the coefficient of determination (R^2), standard deviation ($S_{y,x}$) and akaike's information criterion (AIC) and to generate growth parameters such as growth rate (GR) and lag time (LT). The growth parameters obtained from the primary model with the best statistical fit were used to develop the square root model as secondary model. The reliability of developed models was evaluated by statistical indices such as bias factor (B_f), accuracy factor (A_f), and root mean square error (RMSE). The results proved that the modified Gompertz model was more reliable than other models and B_f , A_f , and RMSE of developed models were within the reliable range. Therefore the established models can be used as a rapid and efficient method for the microbial growth prediction of *L. monocytogenes* in sausage and also can be regarded as valuable tools for HACCP system during the manufacturing process.

Key words: *Listeria monocytogenes*, sausage, predictive model, primary model, secondary model.