MATHEMATICAL MODEL FOR PREDICTING GROWTH OF STAPHYLOCOCCUS AUREUS AT VARIOUS TEMPERATURES IN HAM

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Enterotoxin producing Staphylococcus aureus in food is one of the most common food poisoning pathogens. This study was performed to develop predictive models for the growth of S. aureus in ham, which is the most popular processed meat product, as a function of storage temperatures. The growth data obtained at different temperatures (10, 15, 20, 25, 30, 35, and 40 °C) were fitted into the modified Gompertz, Logistic, and Baranyi model to generate growth rate (GR) and lag time (LT). The growth parameters obtained from the primary model with the highest coefficient of determination ($R^2$) were used to develop the square root model. The developed model was validated using statistical indices such as bias factor ($B_f$), accuracy factor ($A_f$), and root mean square error (RMSE). Finally the modified Gompertz model was selected as development of primary model. The $B_f$, $A_f$, and RMSE value for the GR were 1.007, 0.992, and 0.026, while they were 1.034, 0.966, and 0.128 for LT, respectively. These values were within the reliable range. The results proved that predictive values for the microbial growth of S.aureus corresponded with observed values. These models can be used as a rapid and efficient method for growth prediction of S.aureus in ham. Therefore, the developed models are regarded as valuable tools for HACCP system during the manufacturing process and also can be used to assess the risk of S.aureus contamination in ham.

Key words: Staphylococcus aureus, Ham, Gompertz model, Square root model, Predictive model