Effect of natural microbiota on growth of Salmonella spp. in fresh pork – A predictive microbiology approach

This study was undertaken to model and predict growth of Salmonella and the dominating natural microbiota, and their interaction in ground pork. Growth of Salmonella in sterile ground pork at constant temperatures between 4 °C and 38 °C was quantified and used for developing predictive models for lag time, max. specific growth rate and max. population density. Data from literature were used to develop growth models for the natural pork microbiota. Challenge tests at temperatures from 9.4 to 24.1 °C and with Salmonella inoculated in ground pork were used for evaluation of interaction models. The existing Jameson-effect and Lotka–Volterra species interaction models and a new expanded Jameson-effect model were evaluated. F-test indicated lack-of-fit for the classical Jameson-effect model at all of the tested temperatures and at 14.1–20.2 °C this was caused by continued growth of Salmonella after the natural microbiota had reached their max. population density. The new expanded Jameson-effect model and the Lotka–Volterra model performed better and appropriately described the continued but reduced growth of Salmonella after the natural microbiota had reached their max. population density. The expanded Jameson-effect model is a new and simple species interaction model, which performed as well as the more complex Lotka–Volterra model.

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