Prediction mathematical models of *Pseudomonas fluorescens* growth under different temperature e pH values

Autores Gonçalves, L.D. A.[1], Piccoli, R. H. [2], Peres, A. P.[2]

Instituição [1] UFTM/ICTE – Universidade Federal do Triângulo Mineiro/Instituto de Ciências Tecnológicas e Exatas (Av. Dr. Randolfo Borges Junior, 1250, Univerdecidade, 38064-200, Uberaba/MG)

[2] UFLA – Universidade Federal de Lavras (Câmpus Universitário, Caixa Postal 3037, CEP 37200-000 • Lavras/MG)

Resumo:

Meat is one of the most perishable foods, due to its nutrient availability, high water activity, and pH around 5.6, thus it is regarded as a suitable medium for microbial growth. Fresh meat exposed to oxygen is subjected to the action of spoilage microorganisms, including *Pseudomonas spp*. that is aerobic psychrotrophic proteolytic and lipolytic species, responsible for the appearance of slime and off-flavor in food. To predict the growth of *P. fluorescens* in fresh meat at different pH values (5.5, 6.0 and 6.3), stored under refrigeration and temperature abuse (4°C, 7°C and 12°C), a microbial mathematical modeling was applied. The primary Baranyi and Roberts and modified Gompertz models were adjusted to the experimental data to obtain the growth parameters. The Ratkowsky extended model was used to evaluate the effect of pH and temperature on the growth parameter μ_{max}, and all adjustments have been made through the program DMFit 3.0. The primary modeling has shown that the increase or decrease in pH had a little effect on the microbial growing parameters, when compared with the temperature conditions. It was observed that the increase in storage temperature from 4 °C to 12 °C led to a decrease in the lag phase and an increase in the exponential phase. This behavior led to populations of about 6 log CFU/mL after 70, 40, and 24 hours, at 4 °C, 7°C, and 12 °C respectively. With respect to the combined effect of temperature and pH, in general, the increase in temperature concomitant with higher pH led to an increase in μmax and a decrease in λ value, especially considering the temperature abuse tested. This emphasizes the importance control and maintain the refrigeration temperature within the acceptable limits to ensure the security and integrity, and to extend the shelf life of meat products. The experimental data showed good fit for both models tested, and the primary and secondary models generated from Baranyi and Roberts values were better validated. Thus, these models can be applied to predict the growth of *P. fluorescens* under the same conditions tested.

Keywords: deterioration control, meat, modeling.

Agência fomento: CNPq