MODELING THE GROWTH OF *Salmonella* SPP. IN ITALIAN FRESH RICOTTA

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When post-process contamination occurs, the physical-chemical characteristics of fresh ricotta, e.g. high moisture, low salt content and pH values close to neutrality, make this product a suitable substrate for the growth of several pathogenic microorganisms, including *Salmonella* spp. Some models able to predict the behaviour of *Salmonella* spp. in many specific substrates (broth, chicken, lettuce, and pork) have been already developed, but a validated model to be applied for fresh ricotta is still not available. In this study, a cardinal parameter model was developed and successfully validated for the growth of *Salmonella* spp. in several brands of Italian fresh ricotta. For the model development, ricotta from a major Italian producer was obtained and growth data for *Salmonella* spp. were generated in three challenge tests at static temperatures (10°C to 20°C), by inoculating ricotta with a mixture of *Salmonella* spp. isolates. For the validation step, samples from the same producer and three other producers were obtained and four challenge tests at static (13°C to 20°C) and dynamic temperature profiles (10°C-14°C) were performed. The gamma type cardinal parameter secondary model covering the influence of temperature [1], pH [2] and organic acids [3] was considered. In particular, the concentrations of the undissociated form of lactic, citric and acetic acid, calculated as suggested by Mejlholm and Dalgaard [4], were used in the model equation. The validation of the model included an assessment of both the ability to predict maximum specific growth rate (μ_max) using two approaches: bias (Bf) and accuracy factor (Af), and the acceptable simulation zone (ASZ). The model for *Salmonella* spp. showed good performances with Bf of 1.10, and an average of 91% of observations within the ASZ. Comparing the performances of other existing models for this pathogen, a general underprediction of the growth rate when applied to ricotta was evidenced. The model developed and successfully validated could be applied by a high number of users with the aim to assess levels of this pathogen in ricotta under both static and dynamic environmental conditions, being useful for the dairy business operators as they cover a wide range of the brands available on the market.

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