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Pasta Salad Predictor – development of a new tool to support shelf-life and safety management

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Abstract

Ready-to-eat (RTE) pasta salads from small food outlets are popular but they have short shelf-life due to growth of spoilage microorganisms. Importantly, RTE pasta salads have resulted in several major outbreaks of food-borne disease *e.g.* due to *Salmonella*. We studied oil based pasta salads with the objective of developing a new predictive tool to support shelf-life and safety management. High concentrations (6-8 Log CFU/g) of *Enterobacteriaceae*, lactic acid bacteria (LAB) and *Pseudomonas* spp. were detected in different commercial products based on cooked pasta, raw vegetables, pesto and fermented cheese and olives. Storage trials, challenge tests and experiments with liquid laboratory media (Bioscreen C) at 5, 10, 15 and 20°C allowed growth of *Enterobacteriaceae*, LAB, *Listeria monocytogenes*, *Pseudomonas* and *Salmonella* to be quantified. The effect of temperature on growth rates (μ_{max}) was appropriately described by the simple square root model. Growth responses in pasta salads were compared to our new secondary temperature models as well as available models. The most appropriate models were then included in a spreadsheet-based Pasta Salad Predictor. Growth of psychrotolerant *Pseudomonas*, originating from raw vegetables and initially present in concentrations as high as 6 Log CFU/g, limited shelf-life of the pasta salads included in this study. The developed Pasta Salad Predictor allowed shelf-life and safety of the product to be evaluated based on both initial microbial contamination (hygiene), storage time and storage temperatures (constant or variable). This new predictive tool seems useful to help food outlets and authorities reach a common understanding of reasonable hygiene requirements and storage conditions for pasta salads.

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