

A new approach for the shelf-life definition of minimally processed carrots

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Abstract

The shelf-life of minimally processed carrots is considered strictly correlated to the microbial outgrowth and appearance deterioration. However, during storage minimally processed carrots undergo also to a nutritional and sensory quality decay that can affect the consumer's acceptance of the product. This research aimed to verify the importance of considering the interaction between product and consumer's quality perception in the shelf-life definition of minimally processed carrots. For this purpose, changes of the microbial population, pH, a_w , carotenoid content, volatile profile, sensory features, and consumer acceptability of minimally processed carrot samples were investigated during 9-day refrigerated storage (labeled shelf-life). The recorded results highlighted that whereas the microbial counts remained below the maximum acceptable contamination values for more than 6 days of storage, significant changes ($P < 0.05$) occurred in most of the considered quality parameters starting already from the 3rd day of storage. This quality decay was perceived also by consumers that, evaluating the global acceptability of the minimally processed carrots attributed significantly ($P < 0.05$) lower scores at samples stored for three days or more. Based on the consumer acceptance/rejection responses, a preference distribution function was obtained by applying the Survival Analysis methodology and a shelf life of four days at 4 °C were estimated.

In conclusion, this study demonstrated that the shelf life of fresh-cut carrots is strongly dependent on sensory quality, as a consequence the shelf life estimation based on consumer perception, by the application of the Survival Analysis methodology, resulted to be more reliable than that estimated on the basis of the microbial load of the produce.