

Title Microbial safety and quality of fresh-cut lettuce packaged under modified atmospheres
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Abstract

Modified atmosphere packaging (MAP) is commonly used for fresh-cut vegetables though, several problems with MAP regarding quality and microbial safety of the products remain to be solved. With selection of less permeable packaging films and temperature abuse, O₂ is depleted during shelf life, resulting in anaerobic conditions within packages, production of off-odors, and rapid deterioration. Also, packaging conditions have been shown to transform the microbial ecology of the fresh-cut products. Thus, a better understanding of the packaging effect on fresh-cut vegetables is needed to secure microbial safety and keep acceptable sensory quality. In this study, viability of selected pathogenic bacteria inoculated on cut lettuce was observed along with quality attributes to investigate the packaging treatment effect. Fresh sound lettuce was cut, inoculated with a cocktail of the 4 bacterial cultures to contain 10³-10⁴ CFU/g, stored at 5°C overnight, and then packaged hermetically in plastic films. Five different packaging treatments, including two passive MAP, two active MAP and vacuum packaging (VP), were used for the lettuce. Microbial cell counts and several quality attributes were measured during storage at 5°C for 10 days. Overall passive and active MAP did not suppress growth of the bacteria even under high CO₂ conditions. Moreover, the accelerated proliferation of the pathogenic bacteria could be observed in VP with low partial O₂ pressure, although its visual quality was evaluated to be still acceptable. Such increase in viable cell counts was the most prominent for *L. monocytogenes*. No significant difference between the packaging treatments could be found for color and ascorbic acid content. However, active MAP with high O₂ and CO₂ showed relatively good visual quality of lettuce samples during storage. Results suggest that high O₂ MAP can be used as a potential packaging treatment for keeping high quality of refrigerated fresh-cut vegetables.