

Combination of sodium alginate-based coating with L-cysteine and citric acid extends the shelf-life of fresh-cut lotus root slices by inhibiting browning and microbial growth

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Abstract

The effects of a sodium alginate (SA) coating combined with L-cysteine (L-cys) and citric acid (CA) on browning and microbial growth in fresh-cut lotus root slices during storage at 4 °C were investigated. The SA+L-cys+CA treatment was more efficient than separate SA and L-cys+CA treatments in the maintenance of visual appearance and flavour quality. The SA+L-cys+CA coating improved the ability of antioxidant enzymes (superoxide dismutase, catalase and ascorbate peroxidase) to scavenge reactive oxygen species, including $O_2^{\cdot-}$ and H_2O_2 . In comparison to the control, the SA+L-cys+CA treatment lowered the activity of phenylalanine ammonia lyase, peroxidase, and membrane lipid-degrading enzymes (phospholipase D, lipase and lipoxygenase) and furthermore, maintained high amounts of unsaturated and saturated fatty acids as well as low levels of phenolics and malondialdehyde. The bacterial diversity in lotus root slices was also determined and discussed. The SA+L-cys+CA treatment could maintain the shelf-life of fresh-cut lotus root slices for 14 d at 4°C, which provides a theoretical basis for commercial application.