

Title Prevention of browning in sliced apple and banana by dipping in oxalate solutions
Author R. Yoruk and M.R. Marshall
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Abstract

World production of apples and bananas was estimated to exceed 35 and 85 million tons/yr, respectively. Bananas are one of the main crops in tropical and subtropical developing countries. Large economic impact from browning discoloration in the fruit industry necessitates its control in order to maintain quality and extend product shelf-life. There is interest in controlling discoloration with natural compounds. The objective of this study was to investigate treatment effectiveness of a natural compound, oxalic acid (OA), in controlling browning discoloration associated with minimal processing of apples and bananas. Apples (Red Delicious cultivar) and bananas were peeled, sliced and dipped in OA solutions for 10 min at concentrations of 0 to 40 mM and 0 to 100 mM respectively. Color was quantified by a machine-vision system immediately after treatment (0 h) and every 1 h during storage at 23 °C for 5 h for banana and 7 h for apples. The intensity of browning on the fruit surfaces was evaluated based on the experimental variables (OA concentration and storage time). The reproducibility between 2 replications regarding the overall trend in changes in CIE L* values was observed. Residual OA concentration in the tissues was also determined. Preservation of color increased with increasing OA concentration, regardless of storage period. The most effective color preservation on sliced apples and bananas was obtained with treatments containing 5 and 60 mM OA, respectively. Minimum average concentration of OA dehydrate in the treated apple and banana tissues for an effective anti-browning activity was 10 and 85 mg/100g of fresh material, respectively. Using OA to preserve color of apple slices at concentrations below the level naturally occurring in several foods of plant origin does appear feasible. If oxalic acid were used to control browning on sliced banana, magnesium and/or calcium supplementation may be required.