FACTORS AFFECTING THE POST-CUTTING LIFE AND QUALITY OF MINIMALLY PROCESSED PINEAPPLE

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1. Introduction

Sliced pineapple has been shown to have a post-cutting life that is strongly influenced by temperature, from a few hours at 20°C to more than five weeks at 1°C (O’Hare, 1994). O’Connor-Shaw et al. (1994) reported that pineapple cubes, stored in polypropylene containers at 4°C, kept their sensory attributes for 7 days, but after 11 days showed brown discoloration, and after 14 days off-odors and softening were apparent. Spoilage is associated with an increase in respiratory activity, due to the growth of microbial flora (Iversen et al., 1989). Prolonged storage of intact pineapple fruits at temperatures below 12°C leads to the appearance of chilling injury symptoms, a problem that can be alleviated by the use of controlled or modified atmospheres (Paull et al., 1985; Chitarra et al., 1999). The aim of this work was to determine the suitability of “Champaka” pineapple for fresh-cut processing and to study the influence of refrigerated and controlled and modified atmosphere storage on the post-cutting life and quality of the product.

2. Materials and methods

Pineapple fruits (Champaka cv., Dole "Premium" brand) were received from Hawaii and stored at 10°C until processed. After peeling and coring the fruits, the pulp was sliced into 1cm thick wedges (about 8 g each), dipped in a 100 ppm sodium hypochlorite solution for 2 minutes, and blotted dry. For controlled atmosphere (CA) experiments, 1liter glass jars, each containing about 300 g pulp wedges, were continuously flushed with a humidified flow of air or the desired gas mixture. For modified atmosphere (MA) experiments, 500 ml oriented polystyrene (OPS) cups, containing 150 g pulp wedges, were thermally sealed with Mylar® film. Destructive (TSS, pH, acidity, firmness) and non-destructive (CO2, O2 and ethylene concentrations, Lab color) parameters were periodically determined as customary. Final sensory evaluation was performed by at least three untrained panelists in some experiments.

3. Results and discussion

Post-cutting life was heavily influenced by temperature, ranging from 4 days at 10°C to over two weeks at 0°C. The end of commercial life was indicated by a sharp rise in respiration followed by an increase in ethylene production. Continuation of storage beyond this point led to the appearance of off-flavors and odors and microbial spoilage. Reduction of the O2 levels during storage at 5°C led to a reduction in the respiratory rate and to the retention of the yellow color of the wedges, whereas high CO2 reduced brown discoloration. Under the most favorable conditions (2% O2 + 10% CO2), post-cutting life was extended beyond two weeks. The MA packaging system used was effective in achieving the desired equilibrium O2 and CO2 concentrations at 0°C. At 5°C, even though these concentrations reached levels lower than 2% and higher than 15% respectively, no
off-odor or off-flavors were detected after a 2-week storage period.

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References