Title Use of modified atmosphere packaging to extend shelf-life of minimally processed jackfruit (*Artocarpus heterophyllus* L.) bulbs

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Abstract

The study was carried out to investigate the effect of different modified atmosphere packaging (MAP) techniques for extending the shelf-life of fresh-cut jackfruit (*Artocarpus heterophyllus* L.) bulbs kept under low temperature conditions. MAP carried out consisted of 3 kPa O_2 + 5 kPa CO_2 (with balance of N_2) gas mixture flushed polyethylene (PE) bags, polyethylene terephthalate (PET) jars with silicon membrane window on lid and PE bag with air. Fresh-cut jackfruit bulbs were given a post-cutting phytosanitation wash followed by a dip pretreatment with calcium chloride, ascorbic acid and sodium benzoate under mild acidified conditions prior to MAP. Non-dipped samples packaged in same type of MAP conditions were used as control. Dip pretreatment along with different MAP was found effective in establishing optimum O_2 and CO_2 concentrations, reducing the respiration rate, ethylene production and electrolyte leakage, restricting changes in total soluble solids (TSS)/titrable acid (TA) ratio and maintaining sensory attributes of the samples compared to control (non-dip) samples kept under same MAP conditions at 6 °C. Dip pretreated sample packed in 3 kPa O_2 + 5 kPa CO_2 gas mixture flushed PE bags was found to preserve the initial firmness value of the jackfruit bulbs (about 44 N) with a minor loss of around 7% after 35 days compared to significantly higher loss in the control samples packaged in the same MAP. Dipped samples also maintained a significantly higher lightness (*L* value) and color intensity (chroma) of jackfruit bulb surface compared to the control fruit. PET jar with silicon membrane window was also found to be capable of achieving equilibrate atmosphere more efficiently than PE bags which in turns maintained more stable gas composition and minimized physiological and quality changes. On the basis of sensory quality attributes, the shelf-life of pretreated jackfruit bulbs packaged in gas mixture flushed PE bags, in PET jars with silicon membrane window and in PE bag were 35, 31 and 27 days, respectively.