

Kedwadae Atchawisit 2009: Extending Shelf Life of Fresh Cut Mangoes cv. Namdokmai using High Gas Permeable and Antimicrobial Films. Master of Science (Packaging Technology), Major Field: Packaging Technology, Department of Packaging Technology and Materials. Thesis Advisor: Associate Professor Vanee chonhenchob, Ph.D. 136 pages.

Demand for fresh cut tropical produce has continued to increase across the world, but such products have a short shelf life. Therefore, the objective of this study was to determine the effect of controlled atmosphere (CA) storage and modified atmosphere packaging (MAP) using high gas permeable films on quality of fresh cut mangoes (cv. Namdokmai). Oxygen tolerance limit of fresh cut mangoes was 5 %O₂ (with 0.03% CO₂ and N₂ balance), while carbon dioxide tolerance limit was 10 %CO₂ (with 16-18%O₂ and N₂ balance) in 5 °C. The O₂ level less than 5% and the CO₂ level greater than 10% caused an accumulation of ethanol. The optimum controlled atmospheres of fresh cut mangoes were 5-10%O₂ and 5-10%CO₂. Fresh cut mangoes were packed in the polypropylene trays sealed with three types of high gas permeable films (PE, PE-1, and PE-2) with various oxygen transmission rates (OTR = 9,205, 14,154, and 22,932 cm³/m².day), respectively and stored at 5 °C. LDPE film (OTR = 4,100 cm³/m².day) was used as control. In-package gas compositions at equilibrium were 6 %O₂ + 11 %CO₂ in PE, 5 %O₂ + 7 %CO₂ in PE-1, and 6 %O₂ + 5 %CO₂ in PE-2. In the LDPE packages, carbon dioxide accumulated and oxygen decreased during storage. PE-1 and PE-2 maintained physicochemical and microbial quality for 15 days with firmness higher than 2 N/m², L* higher than 65, ethanol content less than 1 mg ethanol/g mangoes, total plate count less than 6 log CFU/g, yeast and fungi less than 4 log CFU/g, while LDPE could maintained quality of fresh cut mangoes for 7 day. The highest accumulation of ethylene was in LDPE, while the lowest ethylene content was observed in PE-2. PE-1 affixed with a 1×1.5 cm-antimicrobial films (PE-1/ethylene vinyl acetate (EVA) films incorporated with thymol and eugenol) could reduce microbial counts in fresh cut mangoes. However it could not prolong the shelf life of fresh cut mangoes as fresh cut mangoes was deteriorated due to senescence with firmness loss. Development of the antimicrobial films in this way could be beneficial in extending shelf life of other products which are deteriorated mainly from microbial spoilage.

Student's signature

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