Abstract

Modified Atmosphere Packaging Enhances the Effectiveness of Coolbot™ Cold Storage to Preserve Postharvest Quality of Mango Fruits

Recently, the Coolbot™ technology was introduced to smallholder farmers in Kenya as a low-cost alternative to conventional cold rooms. The present study sought to establish the additive benefits of cold storage under Coolbot™ cold storage and modified atmosphere packaging (MAP) in mango fruits. The participatory study was conducted in Makueni County of Kenya between November 2014 and July 2015. The mango fruits (variety “Apple mango”) were harvested at mature green stage from commercial orchards owned by smallholder farmers. The fruits were selected for uniformity and randomly separated into four batches which were subjected to four different treatments (storage conditions). The treatments included fruits packaged using Activebag® MAP or not packaged and either stored in the Coolbot cold room or at ambient room conditions. A random sample was taken at regular intervals from each of the four storage environments and evaluated for ripening and quality related changes during storage. The parameters evaluated included physiological weight loss, respiration, firmness, color, sugars and vitamin C. Results showed that cold storage extended the shelf life of mango fruits by 23 days without MAP and 28 days with MAP, in comparison to storage at ambient room conditions. Slow ripening under cold storage (with and without MAP) was evidenced by lower rates of respiration, softening, color changes and sugars accumulation compared to ambient room conditions. In addition, cold-stored mango fruits maintained better nutritional quality as evidenced by higher vitamin C levels, 59.77 mg/100mL and 51.8 mg/100mL with and without MAP respectively at the end of storage (day 40 and 35). This was significantly higher (p