

Title Effect of controlled and modified atmosphere storage on postharvest quality of two Nordic apple cultivars

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Abstract

The experiment was undertaken at the Estonian University of Life Sciences in 2010/2011. The aim was to improve the postharvest quality and extend marketing period of apple cultivars 'Liivi kuldrenett' and 'Talvenauding' by controlled atmosphere (CA) and modified atmosphere (MA) storage. Since high investment required in constructing CA storage facilities is not affordable for small-scale apple producers, using MA could be a more affordable alternative. The following storage regimes were used: 1) NA - normal atmosphere cool store; 2) MA 60 - 60 μm LDPE bag; 3) MA 120-120 μm LDPE bag; 4) CA 1.5: 1.5 - O₂ and CO₂ content 1.5%; 5) CA 2:0.5 - O₂ content 2% and CO₂ content 0.5%. Air temperature during storage was 2 \pm 2 °C and relative humidity 85-95%. Each treatment consisted of 10 kg apples in six replications, three of the replicates were opened after 3 and 5 months of storage, respectively. O₂ and CO₂ content was measured from the packages every week. Fruit firmness, soluble solids content (SSC), titratable acidity (TA) and ascorbic acid content (AAC) were determined at harvest and after storage. Postharvest loss was determined after 3 and 5 months of storage. The experiment revealed that some apple cultivars can respond positively to high CO₂ (up to 7%), if the O₂ content is not reduced below 15%. For 'Liivi kuldrenett', the best storage regime was CA 2:0.5, which significantly reduced postharvest loss compared to all other treatments, maintained fruit firmness and SSC/TA and indicated that the taste of apples was also better. Both MA regimes and CA 1.5: 1.5 reduced postharvest loss by 50% as compared to NA after 5 months of storage. Apple internal quality parameters were the best in MA 60 treatment. For 'Talvenauding' apples, the used MA or CA regimes cannot be recommended, since all promoted development of superficial scald.