

Abstract

Green celery stalks may be stored at 0 to 4 °C and about 95% RH in air for up to 2 to 6 weeks. In those conditions undesirable quality changes reducing shelf life are observed. Controlled atmosphere (CA) has been shown as useful to inhibit those processes. Celery is an important source of mannitol, an uncommon sugar for vegetables. As far as we know there are not reports about the effect of CA with CO₂ levels over 10 kPa on the main sugars present in celery that was studied in the present work. Horticulturally mature celery stalks cv. 'Trinova' were hand harvested and transported at about 5° C to the laboratory where they were carefully inspected selecting those with similar visual appearance and free from discoloration, dehydration, and decay. Plants of uniform size were washed, drained and stored in hermetic glass jars at 4° C during 35 days. Continuous humidified flows through of either air (as control), 5kPa O₂ + 5kPa CO₂ (AC5), 5kPa O₂ + 15kPa CO₂ (AC15) and 5kPa O₂ – 25kPa CO₂ (AC25) were applied. At the beginning of the experiment and at the end of cold storage sugars content was measured by using a HPLC equipped with a refractive index detector (7 samples by treatment). Respiration rate was monitored along the experiment by using a closed system. Respiration rate was high at the beginning of storage, decreasing rapidly and being stable until the end. The highest rate was for air stored celery. CA storage reduced the respiratory activity being that reduction related to the CO₂ concentration with no differences among CA treatments. As expected, mannitol was the predominant sugar followed by fructose and glucose. After storage, total sugar content decreased for air but not for CA5 and CA15, probably indicating a lower respiration rate which would retard loss of sugars. Comparing CA, fructose decreased for CA25 and non significant changes were detected for remaining sugars in any CA treatment. Like observed in previous studies for other quality parameters, CO₂ levels over 15 kPa seems to be detrimental for sugar maintenance. After 5 weeks of cold storage, atmospheres with 5 kPa of O₂ and 5 to 15 kPa of CO₂ provided the best results.