

Abstract

Differing cultivar tolerances and responses to stress during growth are hypothesized to influence the photosynthetic apparatus and storage quality of iceberg lettuce. Hence chlorophyll fluorescence was measured as an indicator of the storage potential at harvest. Chlorophyll fluorescence (F_v/F_m , q_p , Φ_{PSII} , and q_N) invariably indicated that the photosynthetic efficiency of 'Salinas' was superior to 'Ithaca'. However, after 14 and 21 days at 6°C, superior quality was attributed to either cultivar, depending upon the harvest. Apparently, photosynthesis was only marginally influenced by preharvest stresses affecting storage potential, and cultivar differences in inherent photosynthetic capacity masked stress effects. In a second study, chlorophyll fluorescence did not detect ethylene-induced stress of lettuce leaves held at 6°C for 11 days, even when stress symptoms (russet spotting) were visible, suggesting the photosynthetic apparatus is insensitive to ethylene stress. A new instrument-based deformation test was found to correlate highly with the traditional method of firmness evaluation of iceberg lettuce.