

Abstract

Cultivar performance of litchi (*Litchi chinensis* Sonn.) and roles of water loss and calcium in postharvest fruit senescence were studied. Desiccation and membrane breakdown were accelerated once litchi fruit were detached from the tree. Membrane breakdown began from the inner part (mesocarp) of the pericarp within 2 days after harvest (DAH) and within 5 DAH in the sclerenchyma exocarp cells. Membrane breakdown was not yet observed at 5 DAH in the epidermis cells, where a very high calcium concentration was revealed by X-ray microanalysis. Transfusion of water to the fruit through the stalk slowed fruit water loss and browning within 4 DAH, but the treated fruit tended to rot from the internal and deteriorated entirely by 6 DAH. There was no difference in response to transfusions of water and calcium chloride (18 mmol/l) solution. Among the five tested cultivars, 'Nuomici' had the shortest shelf-life, while 'Guiwei' had the longest. Desiccation rates of these cultivars were not consistent with their fruit deterioration rate. Concentration of structural calcium in the pericarp was negatively correlated to fruit deterioration rate and membrane leakage. The results suggest that calcium in structural form may influence fruit senescence through its role in tolerance to desiccation and in maintenance of membrane integrity. Preharvest spray of calcium chloride (40 mmol/l) at different stages of fruit development failed to increase structural calcium in the pericarp and was ineffective in slowing fruit senescence.