

Abstract

The effect of added calcium on respiration, ethylene evolution and ripening at 20°C were investigated on Hass, Fuerte and Sharwil avocado. Levels of calcium in the fruit, calcium movement and changes in bound and free calcium were determined. The effect of calcium in conjunction with low temperature and modified atmosphere on ripening was also studied.

Postharvest life of avocados at 20°C was extended by infiltration with 4% calcium at 33, 48 and 50 kPa for Hass, Sharwil and Fuerte fruit, respectively. The magnitude of the response in fruit obtained from 96 growers in the three major growing areas over two seasons varied. Hass and Fuerte fruit from 46% and 62% of growers examined showed a significant response to calcium with the extension in ripening time being about 40% over untreated fruit from the same growers. Sharwil fruit showed the greatest response with 100% of growers having an extension in ripening time of about 50% over untreated fruit. The quality of ripe fruit was not affected by calcium infiltration.

The calcium level in flesh tissue, regardless of whether it was endogenous or added calcium, was found to be positively correlated with ripening time. The magnitude of this correlation was greater than that for calcium level in the skin or total fruit calcium (flesh plus skin) or calcium uptake. However, the correlation was not sufficiently strong to allow flesh calcium level to be used as a general ripening index.

Studies on the distribution of calcium in untreated fruit found 2-3 times more calcium in the skin than flesh tissue of unripe fruit. Calcium infiltration effected a significant increase in calcium in both skin (70% of calcium uptake) and flesh tissue. Calcium in flesh tissue increased significantly on ripening in untreated and calcium-treated fruit.

Calcium used in conjunction with low temperature or modified atmosphere did not produce any additional marked delay in ripening compared to untreated fruit stored under the same conditions. Calcium showed an inconsistent effect on chilling injury with a significant reduction occurring in only some experiments.

Commercial use of calcium infiltration technique is variable and can not be recommended for general use. It could be of benefit for particular growers but needs to be evaluated individually to determine whether their fruit reliably responds to calcium.