Title Treatment temperature effect of calcium on fresh-cut cantaloupe melon

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Citation Book of Abstracts, 2004 IFT (Institute of Food Technologists) Annual Meeting and Food Expo, 13-16 July 2004, Las Vegas, Nevada, USA. 321 pages.

Keywords fresh cut produce; cantaloupe; calcium

Abstract

Pre- and postharvest calcium solution applications have been used to extend postharvest shelf-life of fruits and vegetables. Calcium application often results in reduced rates of respiration and ethylene production, increased firmness and reduced incidence of physiological disorders and decay. The essential role of calcium in delaying plant senescence is largely associated with its stabilizing influence on cell membranes. Horticultural products are often cooled after harvest and maintained at low temperatures until they are transferred to retailers and/ or processed. Studies that involve the use of dip solutions that contain processing aids such as calcium have, however, been conducted in solutions at refrigerated and ambient temperatures. The objective of this study is to determine the effect of dip solution temperature on metabolic activity of calcium treated fresh cut cantaloupe melon during storage. The effect of calcium solution temperature on the activities of 2 enzymes (lipase and esterase) that catalyze lipid hydrolysis, lipase was also determined. Fruit dipped in calcium solution at 4 °C emitted less carbon dioxide and consumed less oxygen during storage for 12 d at 10 °C than fruit treated with calcium at ambient temperature and untreated fruit. Dipping in calcium solution at the lower temperature prevented moisture loss during storage. Lipase activity was reduced by use of calcium solution at both temperatures but did not affect esterase activity. Inhibition of enzymatic activity in fruit pieces treated at 4 °C was considerably higher, causing undetectable lipase activity in the freshly processed cut fruit and after storage for 24 h. Viscosity of pulverized cantaloupe melon with added calcium lactate at 4 °C was higher than fruit blended under similar conditions at ambient temperature. This effect suggests the ability of calcium to confer rigidity to the tissue components at low temperatures, possibly through improved convalent crosslinking. This effect presumably causes lipase to remain in its latent inactive form during the early stages of treated fruit storage.