Abstract

Refrigerated storage is widely used to extend the life of fruit and vegetables after harvest. The reduction of temperature decreases the cellular metabolism and delay fruit senescence and ripening. Subtropical fruit such as avocado (*Persea americana*), are less tolerant to the reduction on temperature than temperate fruit, resulting in the development of physiological disorders. Therefore, the main objective of this work was to study the underlying mechanism leading to the development of internal browning (IB) in Hass avocado. IB was studied considering harvest time (early vs. late harvest), storage temperature (5°C vs. 0°C), and ethylene inhibition (1-methylcyclopropene). In general we observed a higher incidence of IB in late harvested fruit and in the one stored under 0°C. From this study we could relate the generation of IB to a two enzymatic steps related to lipid metabolism, i.e. the enzymes Acetyl CoA Carboxylase (ACCase) and Stearoyl ACP desaturase. Regarding ACCase, two subunits were identified and characterized: i) Biotin carboxylase (BC) and ii) Biotin carboxyl carrier protein(BCCP). Full length of the two subunits showed highly conserved domains among the sequences belonging to other plant species. Both genes showed an expression pattern related to the development of IB, where *PamACCase BC* and *PamACCase BCCP* had a decrease in fruit with IB development, corresponding to avocados from a late harvest or stored under 0°C. *PamSAD* expression had a different response to the genes already mentioned remaining suppressed in fruit with IB symptoms. Relative to ethylene inhibition, only *PamACCase BCCP* and *PamSAD* showed changes in their expression on fruit applied with 1-methylcyclopropene, which would indicate that ethylene could be regulating gene expression. Therefore, it seems that the genes studied in this work could be part of a major mechanism to explain the differential development of IB on Hass avocado.

Key words: *ACCase BC***;** *ACCase BCCP***;** *SAD***;** Internal Browning**;** 1-MCP.