ABSTRACT

In recent years, persimmon crop has become very relevant in Mediterranean Spain, where the production of this fruit centres on only one variety, persimmon cv. Rojo Brillante, majorly located in the Valencian Community. The main postharvest disorders manifested by 'Rojo Brillante' persimmons are flesh browning, which is associated with mechanical damage and chilling injury displayed after low-temperature storage. Previous research has determined the postharvest conditions that lead fruit to develop such alterations. However, the biochemical process behind flesh browning and chilling injury disorders is still unknown.

Currently, there is special interest in introducing cultivars from other countries to broaden the varietal range. Besides, prolonging the fruit storage period to supply the markets according to the demand is one of the main challenges.

In this context, the present Thesis approached three main objectives: 1) Studying the biochemical process implied in the main physiological postharvest disorders manifested in persimmon fruits by focusing on changes in the fruit redox state; 2) Evaluating postharvest treatments to preserve fruit quality during cold storage; 3) Assessing the physico-chemical and nutritional quality of persimmon cultivars introduced from other countries to increase the varietal range.

Biochemical, chromatographic and microstructural studies have revealed that flesh browning manifested by fruits submitted to mechanical damage after removing astringency is associated with a tannins oxidation process caused by a stress oxidative situation. A new flesh disorder, "pinkish bruising", has been described on fruits submitted to mechanical impacts while showing high astringency levels. Sensitiveness to the flesh browning disorder has also been evaluated on different cultivars introduced from other countries.

The implication of the redox system in the chilling injury manifestation on 'Rojo Brillante' persimmon has been determined. Moreover, we described the changes in this system associated with chilling injury alleviation by 1-MCP treatment.

The effect of a controlled atmosphere based on 4-5% O_2 + N_2 to prolong the storage of cultivars 'Rojo Brillante' and 'Triumph' has been seen to strongly depend on variety. The results were highly positive on cultivar 'Triumph', in which the evaluated atmosphere extended the storage period up to 3 months.

The use of short-term high CO_2 treatments was another technology assayed to alleviate chilling injury in non-astringent cultivar 'Fuyu'. This treatment significantly reduced the main chilling injury symptom manifested by this cultivar, which is flesh gelling. This effect was related to cell structure preservation.

Recent studies have shown that ethyl formate treatment is highly effective for pest control of persimmon 'Fuyu'. However, this treatment induces fruit softening, which causes quality loss. This Thesis revealed that ethyl formate treatment induces the activity of ethylene synthesis-related genes and that flesh softening is mediated by this hormone. It also demonstrated that by applying 1-MPC pretreatment, fruit softening associated with ethyl formate can be controlled. Therefore, the combined used of both treatments is seen as a potential treatment to disinfect persimmon fruits while preserving quality.

Finally, the study of ten cultivars introduced from other countries helped select the most interesting cultivars to broaden the varietal range according to their maturation date and their

response to deastringency treatment. The main nutritional compounds of persimmon and how they are affected by CO_2 deastringency treatment are described.