

## *ABSTRACT*

Citrus fruits are attractive fruits sought after by consumers overall the world for their unique taste, flavor, eating quality and health benefits. After harvest, fresh citrus fruit need to be manipulated at different stages with postharvest treatments before reaching consumers.

Degreening process, by exposing fruit to ethylene, is a postharvest treatment, commonly used to accelerate external color change of citrus fruit since in the Mediterranean area early-season citrus fruit are harvested when fruit reach acceptable internal maturity standards for marketing while their external peel color is still green. Nevertheless, the application of ethylene during degreening treatment, besides the desirable color change, can induce physiological disorders related to peel and calyx senescence (browning and dropping). One objective of the present Thesis was to study different postharvest treatments to improve quality of early-season citrus fruit submitted to degreening treatment. The application of degreening treatments combining periods without ethylene exposure with other with ethylene application significantly reduced the calyx alterations associated with this treatment without affecting the external color evolution. The postharvest application of HF-Calibra®, a growth regulator, also decreased the calyx alteration incidence in all assayed varieties; the higher the doses applied, the lower percentage of fruit with calyx alterations symptom.

Another objective of the present Thesis was to evaluate the effect of the ethylene application, as well as the exposure time during degreening process on bioactive compounds in different cultivars of clementines. The application of ethylene for different duration of treatment did not affect total ascorbic acid (TAA), ascorbic acid (AA), dehydroascorbic acid (DHAA) nor the antioxidant activity of mandarin fruit.

The effect of the degreening treatment under commercial conditions followed by cold-quarantine treatment on the content of vitamin C, phenolic compounds and antioxidant activity, as well as on the volatile compounds of different citrus fruit cultivars was also evaluated. Degreening treatment followed by cold-quarantine storage plus shelf-life did not induce detrimental changes in DPPH and FRAP antioxidant capacities, AA, TAA, DHAA, total phenolic content and the total content of flavanone and flavones of the assayed early-season citrus varieties. In addition, these postharvest treatments did not affect aroma-active compounds.

The introduction of new citrus varieties makes it necessary to study their nutritional composition as well as their postharvest behavior. In the present Thesis the new mid late-season triploid mandarins obtained in the Plant Protection and Biotechnology Center in the Instituto Valenciano de Investigaciones Agrarias were analyzed for the determination of their physico-

chemical and nutritional composition. All the new triploid mandarins showed high quality parameters of juice, with high content in sugars and organic acids, which make them good for fresh consumption. Moreover, these new varieties displayed high nutritional quality which may considerate as a significant source of health promoting components for human diet.

The condition of late harvesting of these new triploid varieties, require a study of its suitability for cold storage. In addition to changes in the internal quality experienced by fruits during storage at low temperature, must be taken into account that some varieties of citrus fruit are susceptible to chilling injury when exposed to low temperatures. In this Thesis, fruits of the new triploid varieties were stored at 1°C, 5°C or 9°C for up 30 days. In all tested varieties the high internal quality remained during prolonged storage, therefore this was not a limiting factor. Nevertheless some varieties exhibited external chilling injury symptoms that limited the storage, so that the recommended temperature-time conditions of storage will be variety-dependent.