Title Prevention and prediction of kiwifruit softening

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Abstract

Softening, specifically early softening, is the main quality problem for export of Chilean kiwifruit. A four-year multifactorial project was carried out to determine the main factors involved in softening, as well as developing a method that could be used for prediction and control. Different trials were performed to determine the influence of growing conditions and the most important fruit attributes on softening susceptibility of kiwifruit cultivated in different climatic areas in Chile. Pre- and postharvest handling techniques, including calcium applications, were also evaluated to identify their effect on quality. Fruit were harvested at 6.2-6.5% soluble solids content (except for maturity effects), and kept under the same storage conditions. Every fifteen days samples were taken to determine softening (number of days elapsing until fruit reached 18 N firmness). Softening did not depend on any particular factor but on a conjunction of growing conditions and vine management practices. Maintenance of fruit firmness was assisted by management that promoted moderate vigour, adequate fruit and plant exposure to light, caused a reduction in competition between fruit and vegetative growth, and high fruit Ca/N ratio. Fruit size, time of harvest, and position on the vine were also important factors. Postharvest handling challenge for Chilean kiwifruit exporters that can be overcome through rigorous temperature management, controlled atmosphere, stringent control of fruit decay and ethylene control. A successful mathematical model to forecast early kiwifruit softening was developed over the last three years of research. Initially, three climatic groups were determined from growing areas in Chile. In each cluster, orchard, plant and fruit variables were evaluated in nine orchards. From these data, two principal components (PC) or synthetic variables (orchard and plant component) were obtained using a PC analysis. Subsequently, a multiple lineal regression in function of the PC was used to predict period of time to reach 18N. This model is presented.