

**Modelling product quality changes as a result of temperature variability
in shipping systems**

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Abstract

Maintaining an optimised environment around horticultural products throughout the supply chain from harvest through to consumption is key to maintaining value and uniformly high quality. Handling system attributes such as storage temperatures, atmospheres surrounding the product, rate of cooling and length of storage all have significant impact on the rate and evenness of fruit quality deterioration. Optimised practice would extend the selling season for produce and reduce variability of quality in the delivered product.

In recent years a number of intensive temperature surveys of both refrigerated shipping containers and vessels have been undertaken to ascertain the variability within produce loads in order to guide export industries on heuristics to minimise undesirable out-turns. This paper will present measured data from a typical container shipment, monitored on a voyage from New Zealand to Europe. Mathematical modelling, as a tool to assess final fruit quality as a result of temperature variability in the shipping system, was then used to illustrate a strong and significant link between changes in fruit firmness in response to temperature history.