

### Abstract:

Fruit firmness is an important quality attribute of 'Hayward' kiwifruit (*Actinidia deliciosa* (A. Chev) C.F. Liang et A.R. Ferguson cv. 'Hayward'). Most studies on the variation in fruit firmness have focused on fruit batches, however within batch firmness variation normally exceeds that between batches. Flesh firmness of commercially packed fruit from 38 growers was measured over two years covering the main harvest season from mid April to early June in Bay of Plenty, the major kiwifruit production region of New Zealand. Fruit weight, colour (L, C, H colour space) soluble solid content, dry matter content and mineral (N, P, K, Ca and Mg) concentrations were measured on individual fruit. The relationship between firmness and other variables was established on an individual fruit basis by stepwise regression. The percentage of dry matter that had solubilised (SSFDM) accounted for 73.8% of the firmness variation. Phosphorus, calcium and fruit hue angle together explained an additional 4.8% of the variation. This relationship was consistent for the validation data set. SSFDM appears to be a better index for determining physiological maturity than soluble solid content. It is concluded that firmness variation of packed kiwifruit is caused by uneven physiological maturity, differences in mineral concentrations and fruit colour.