Abstract

Fruit firmness measurement is a good way to monitor fruit softening and to predict bruising damage during harvest and postharvest handling. Ripening protocols traditionally utilize a destructive penetrometer-type fruit firmness measure to monitor ripening. Until recently, methods of assessing fruit texture properties nondestructively were not commercially available. The nondestructive Sinclair iQ™ firmness tester was investigated to monitor ripening and predict bruising susceptibility in stone fruit. This work was carried out on four peach, three plum, and five nectarine cultivars over two seasons. The correlations between destructive and nondestructive firmness measurements were significant (p-value = 0.0001), although too low for commercial applications as they varied from $r^2 = 0.60$–0.71 according to fruit type. Using a different approach, the relationship between destructive and nondestructive firmness measures was characterized in terms of segregating these fruit according to their stages of ripening. This was done by using discriminant analysis (66–90% agreement in ripeness stage classification was observed in validation tests). Discriminant analysis consistently segregated nondestructive firmness measured fruit into commercially important classes ("ready to eat", "ready to buy", "mature and immature"). These represented key ripening stages with different bruising potentials and consumer acceptance. This work points out the importance to relate nondestructive measurements directly to important commercial physiological stages rather than to correlate them with the current standard penetrometer values. Thus, destructive and nondestructive firmness measurements can be directly used to identify the stage of ripeness and potential susceptibility to bruising during postharvest changes. Further work is recommended to evaluate the performance of this nondestructive sensor in segregating fruit according to their stage of ripeness under packinghouse or processing plant conditions.