

Title Nondestructive sensing of maturity and ripeness in mango
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Abstract

Fruit appearance is often the impetus driving initial purchase by consumers, however customer satisfaction and subsequent repeat purchases are based upon the taste quality of the fruit. Most of the mangoes (*Mangifera indica* L.) marketed fresh in the USA are imported from other countries. Due to the long distances over which mangoes are shipped and the handling environment of the international produce supply chain, the fruit are harvested and transported at the mature green stage, when they are still firm enough to arrive in the USA with minimal losses due to transportation and handling. Flavor quality in mangoes is primarily related to cultivar, maturity stage at harvest, and postharvest handling methods. While a number of objective maturity indices have been developed, many (such as flesh color) are destructive and none are universally used by the industry. As a result, it is common for shipments of mangoes into the USA to contain immature fruit. The marketing of immature mangoes is detrimental to repeat sales as they will not ripen properly or develop good flavor. Currently, five cultivars ('Ataulfo', 'Haden', 'Kent', 'Keitt', and 'Tommy Atkins') represent the majority of mangoes imported into the USA. Limited research has been done on the postharvest quality of these cultivars and the impact of maturity on their flavor quality. This research was conducted to evaluate the potential of five nondestructive instrumental techniques for their ability to provide reliable means of distinguishing between immature and mature mangoes. The five nondestructive sensing techniques were: near infrared absorption spectroscopy for soluble solids and total solids content, visible light absorption spectroscopy for flesh color, low-mass impact for flesh elastic modulus and sonic stiffness, visible and near infrared light scattering for flesh firmness, and e-nose for volatile production.