

Title Methods to measure physicochemical changes during ripening of 'Keitt' mangoes
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Abstract

Various methods to analyze physicochemical characteristics of 'Keitt' mangoes at different ripening stages were compared. Mature green fruit procured from a commercial packing house in California were ripened at 22°C for 14 days. Fruits were evaluated for changes in firmness, color (skin and flesh), total soluble solids (TSS) content, titratable acidity (TA), and dry matter (DM) content every other day. Fruit firmness was determined non-destructively by hand (subjectively on a scale from 1 to 5), with a durometer, and with an acoustic impulse and impact response method (AWETA), as well as destructively by the penetrometer (Fruit Texture Analyzer fitted with an 8 mm probe). Color of the skin and flesh (L^* , a^* , b^* , C^* , and hue angle) were measured by the Minolta chroma meter (CR 300). TSS content was measured on juice collected using a common industry method of squeezing juice from a cut half of the mango fruit by hand compared with juice squeezed from the entire half of mango fruit with a juicer. For DM content, peeled mango tissue was dried in a hot air oven (60°C for 2 days) or in a microwave oven (1.45kW, 35 min at low power). Canonical discriminant analysis (a multivariate technique) was performed to identify the best method to assess firmness, TSS, DM and color of skin and flesh during fruit ripening. The durometer and penetrometer provided the best assessment of changes in firmness during fruit ripening. TSS measurements on the same fruit indicated that squeezing juice using a mechanical juicer from the entire half of the fruit gave more reliable results compared to the hand squeezing method. TSS content measured by the hand squeezing method was higher than TSS content obtained by the mechanical juicer method. However, TSS content measured from juice filtered through four layers of cheese cloth was not different than from unfiltered juice. The DM content was better assessed by drying the sample in a microwave oven than in a hot air oven. The microwave oven can be used as a quick method to determine DM content in both mature green and ripe mangoes. The best attribute to follow changes in fruit color during fruit ripening was the b^* value for the skin, followed by b^* and a^* values for the flesh. From the unripe (0d) to the ripe (14d) stage, TSS content increased from approximately 9% to 17% whereas TA (malic acid) decreased from 0.62% to 0.20%.