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Studies on the high quality distribution technology of fresh fruits and vegetables: Quality control and nondestructive quality evaluation of tree-ripe 'Irwin' mango

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Fruits and vegetables are perishable and to keep qualities of these produces the environmental conditions should be controlled to the appropriate ranges depending on the commodity. Low temperature is well known to have the effect to delay the quality change of fruits and vegetables by reducing the physiological activities, chemical reactions, microbial growth, etc. *Tropical and subtropical origin produces suffer from chilling injury by lowering the temperature below the critical temperature of injury.*

Mango is one of the most important fruits in the world with respect to the amount of production and the dietary means. Generally, mango fruits are harvested at green mature stage and then being stored for ripening or for long term storage. The critical temperature of chilling injury for the mature green mango is reported to be around 13°C. Tree-ripe 'Irwin' mango produced in Miyazaki prefecture has excellent quality because it is harvested at full ripe stage by natural abscission using receiving net. Unfortunately, its short shelf life limits the marketability. There is a strong demand of high quality for fresh fruits and vegetables that can enhance the domestic production. Hence, the present investigation was carried out with an objective of studying the quality control and nondestructive quality evaluation of tree-ripe 'Irwin' mango.

Skin browning and off flavor at the storage temperatures lower than 3.5°C and the decrease in ascorbic acid content at lower than 2°C seem to be the chilling symptom. The decrease in fruit firmness, which reduces the tolerance against the shock and vibration during handling and transportation and spoils the eating texture of fresh, was observed independent of storage temperature. There were no significant change of °Brix, sugars, acidity, and water content. Tree-ripe 'Irwin' mango could be stored for about 4 weeks at the temperature around 5°C without quality loss using modified atmosphere packaging.

The near infrared spectroscopy (NIR) was used to evaluate the mango quality nondestructively by using the wavelength region from 400 to 1100 nm. The multiple linear regression analysis (MLR) and partial least square regression (PLS) were used for calibration and prediction. For MLR, the prediction results were SEP:0.49 °Brix and Bias:-0.12 °Brix, while PLS prediction results were SEP:0.51 °Brix and Bias:-0.16 °Brix. It was concluded that NIR could be used for evaluation of °Brix value of intact mango.