Abstract

Continued growth in trade of fresh mangoes is dependent on subjecting fruits to a range of treatments between harvest and retail to satisfy quarantine requirements and maintain fruit quality. Experiments were conducted to minimise hot water disinfestation injury, control diseases, test effects of hot water (HWT) and storage temperature on quality, electrolyte leakage (EL) and impedance of fruits and explore the potential of EL and impedance as methods of inference to mango fruit quality during storage and ripening. Phased hot water at 36.5°C for 60 min + 46.5°C for 43 min satisfied quarantine requirements, minimised fruit damage and reduced incidence of diseases when combined with 1 day (d) intermittent warming at 34°C during 10 days storage at 13°C. Half-cooling times of air ([approximate]13°C) and 35 min hydro-cooling ([approximate]l4-15°C) were not significantly different. HWT at 46.5°C for 45 min and 2d intermittent warming (34°C) controlled diseases, but caused fruit softening during 12d storage at 13°C in both 'Keitt' and 'Tommy Atkins' mangoes. Electrolyte leakage (EL) increased over time, was highest in inner tissue and fruits held at 13°C and lowest in skin and fruits stored at 4°C. Phased HWT by heat unit equivalent to 1 or 1[Special characters omitted.] of 46.5°C for 90 min caused lower EL than constant HWT. Higher calcium content reduced EL. Impedance decreased with rise in frequency and storage temperature. Fruit yellowness was lowest in skin and highest in inner mesocarp. HWT and storage at 13° or 22°C increased fruit yellowness. Impedance decreased immediately after HWT, but recovered to control level at 5d in fruits held at 4° or 13°C. Impedance was highest in the inner mesocarp and negatively correlated to yellow colour in all fruits and soluble solids (SS) of fruits held at 4° or 13°C, but positively correlated to SS at 22°C. Correlation of impedance against colour was significant in HWT fruits irrespective of storage temperature. Air-cooling is sufficient in dissipating fruit heat. Phased HWT may overcome quarantine restrictions with less fruit damage and maintain fruit quality at 13°C in combination with intermittent warming. Impedance may be modelled as inference maturity and or ripening indices.