

Title Mango fruit appeal after extended cold-storage as it relates to harvest date, and the relationship harvest maturation stage at harvest and spontaneous ripening

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Abstract

Mangoes of the varieties Tommy Atkins, Zill and Kent were harvested weekly from adjacent trees in three cultivar blocks over a period of 5 or 6 weeks once pulp colouration had been initiated. Fruits from each harvest were either (1) assessed immediately for maturation stage attributes, were (2) allowed to ripen at 24°C and then evaluated in terms of various physico-chemical characteristics, and disease and physiological disorder incidence, or were (3) placed in cold storage at two differing cold-storage temperature regimes (28 days at 8°C, or 14 days at 8°C followed by 14 days at 6°C), and then allowed to ripen at 22°C. During the post-storage ripening period the fruits were assessed on a number of occasions in terms of physico-chemical characteristics, and disease and physiological disorder incidence. Time to ripening at 24°C was also determined. In a separate experiment, the percentage of spontaneously ripening fruits per tree was monitored weekly over a six-week period in each of three four- to six-year-old cultivar blocks, namely a Tommy Atkins, Zill and Kent block, once pulp colouration had been initiated. From the time of pulp-colouration initiation, advancing maturation was associated with reductions in pulp penetration pressure and increases in pulp colouration intensity and total soluble solids content (TSS) on harvesting. In each instance, these changes showed a distinct quadratic increase or reduction. Days to ripening at 24°C from harvest decreased from between 14 and 10 days to between 8 and 4 days. Changes in the degree of shoulder development and ground skin colouration were non-existent or slight. Lenticel corking (darkening) was either not noted (Zill, Kent) or was only noted after the fourth harvest (Tommy Atkins). A distinct increase in ground skin colouration (fading of green colour intensity) was only evident in Zill. On ripening, either after exposure or non-exposure to cold-storage, TSS and pulp colouration increased with harvest date. This was associated with increased taste appeal. Reductions in juice pH were not apparent. Associated with advancing maturation stage were increases in disease incidence on ripening. Increases in internal breakdown incidence were not apparent. On ripening, increases in ground skin colouration extent occurred with advancing maturation in the Tommy Atkins and Kent fruits exposed to cold-storage, but were not evident in the Tommy Atkins and Zill fruits allowed to ripen at 24°C after harvesting. Ripening (softening) rate after cold-storage did not apparently bear any relation to harvest date of cold-storage temperature regime. In considering the changes showing significant and precise trend-wise reductions or

increases with harvest date, viz., pulp penetration pressure, pulp colouration and TSS, pulp colouration intensity was deemed to be most suitable index in view of its trend-wise preciseness (reflected by R^2 values varying from 91 to 99%) and its practicability of use. Weekly increases in spontaneous fruit ripening were pronounced, weekly maximum increases being in the order of 32 (Tommy Atkins) to 60% (Kent). A 10% spontaneous ripening tolerance was associated with a pulp-coloration intensity of 33% in Tommy Atkins, that of 61% in Zill, and that of 27.5% in Kent. Fruit appeal on ripening in harvesting at these stages is deemed to be adequate.