

***PHYSIOLOGY AND POSTHARVEST BEHAVIOUR OF MANGO  
(Mangifera indica L. cv. TOMMY ATKINS) FRUIT GROWN UNDER  
WATER STRESS***

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## ABSTRACT

The study mainly aims to establish proper maturity indices and postharvest behavior of mango fruit of Tommy Atkins variety, the effects of irrigated and water-stress on the development, maturity indices and postharvest behavior of this fruits. The fruits were sampled from a farm in Yatta Division, Machakos district.

Changes in various physical, physiological and biochemical were monitored during fruit development from fruit set to maturity. Among the measured parameters include changes in size and weight, sugar, titratable acidity, total soluble solids, and  $\beta$ -carotene pulp content, anthocyanin and chlorophyll peel content, mineral peel and pulp content, respiration and ethylene production rates. In addition, postharvest changes in these parameters were determined. Fruit weight, diameter, length, sugars (sucrose, fructose and glucose), starch showed a steady increase with time declining towards fruit maturity. Total titratable acidity increased just before maturity and decreased at maturity. Total soluble solids increased as the fruit approached maturity irrespective of the treatment.  $\beta$ -carotene content increased with growth of the mango fruit. Anthocyanins content showed a variance but later decreased towards fruit maturity, no ethylene was detected although respiration rates showed a true climacteric curve. There was a high correlation observed between the increase in firmness and starch  $r^2= 0.86$  and  $0.96$  for fruits from irrigated and non-irrigated, respectively. Vitamin C content varied at different stages of growth and development.

Fruits from irrigated and non-irrigated were harvested at 168 DAB (Days after bloom). Fruits from non-irrigated trees had higher percentage weight loss than those from irrigated trees. Individual sugars (sucrose, fructose and glucose) might have increased steady with fruit ripening while starch content, total titratable acidity all decreased with increase in storage days. Total soluble solids increased in both treatments. Respiration rates showed a true climacteric curve.  $\beta$ -carotene increased steadily decreasing at 9 days in storage while the anthocyanin content, firmness and ascorbic acid content decreased with time.

A high correlation was observed between the increase in length and diameter  $r^2 = 0.992$  and  $0.996$  in the fruits from irrigated and non-irrigated trees, respectively. The formula of the equation can be calculated and therefore used by farmers. This is accompanied by an increase in glucose, total soluble solids and a decrease in starch content and firmness. Fruits from irrigated trees matured earlier than those from non-irrigated trees. The mango fruits from non-irrigated trees had a longer shelf life than those from irrigated trees most probably due to a late maximum climacteric peak and higher degree of firmness, a characteristic that makes them good for dessert and export market. The fruit from irrigated trees were higher in total soluble content and  $\beta$ -carotene but had a short shelf life and reduced firmness that makes them suitable for juice production industry and local market.