

Mango (*Mangifera Indica* L. cv. Apple) Fruit Response to Preharvest Bagging and Postharvest
Treatment with 1-Methylcyclopropene

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ABSTRACT

This study investigated the effectiveness of preharvest fruit bagging as a control of Apple mango 'rust', and its influence on fruit growth physiology and quality at harvest and on ripening. Response of Apple mango fruit to postharvest 1-methylcyclopropene treatment was also investigated. Mango (*Mangifera indica* cv. Apple) fruit trees were randomly selected and tagged for subsequent sampling at a commercial farm in Yatta District, a semi-arid region of Eastern Province, Kenya. Sampling and analyses commenced 14 days after bloom (DAB), and fortnightly thereafter up to harvest time at 168 DAB. On-tree fruit bagging was done at 70 DAB, just before manifestation of Apple mango 'rust'. Bagged and unbagged fruits were subjected to sampling and analyses for physical, physiological and chemical parameters. After harvest, both bagged and unbagged fruits were each divided into two equal sets of fruits, with and without 1-MCP treatment at 20 ppm, and subjected to analysis for changes in physical, physiological and chemical parameters during storage at $25\pm 1^{\circ}\text{C}$, $60\pm 5\%$ RH. Sensory evaluation for fruit appearance, colour, taste, texture aroma and overall acceptance was done at harvest and on ripening on a 9-point hedonic scale using 15 untrained panelists.

Unbagged fruits had significantly ($p < 0.05$) fructose, glucose and sucrose, anthocyanin, β -carotene and ascorbic acid contents at harvest. Bagged fruits were more green at harvest, with significantly ($p < 0.05$) higher chlorophyll (b and total) contents, peel L^* value (measure of colour brightness), peel hue angle (measure of colour) and starch content. However, the difference in pulp L values, total titratable acidity, total soluble solids, respiration rate, firmness, fruit weight, fruit equatorial diameter and minerals (Ca, Mg, K and P) content between bagged and unbagged fruits were not significantly ($p > 0.05$) different at harvest. No ethylene was detected up to harvest. Bagged fruits had a significantly higher sensorial score in peel colour and appearance,

with no visible blemishes at harvest. The unbagged fruit had visible blackish brown blemishes due to 'rust

Bagging and 1-MCP treatments had a slight effect on respiration and ethylene production rates, though control unbagged fruits had higher respiration and ethylene peaks of 409.82 ml CO₂/Kg/h and 378.62 nl/Kg/h, respectively. Neither bagging nor 1-MCP retarded fruit ripening. Fruits in all the treatments reached full ripeness and eating quality at 7 days after harvest (DAH). Bagged ripe fruits had higher sensorial score on peel colour, appearance and overall acceptance. The differences in taste, flavour and texture between ripe bagged and unbagged fruits were not significant ($p>0.05$). Unbagged fruits had a higher postharvest weight loss, shriveled earlier and consequently, a shorter postharvest life of nine days compared to 15 days for bagged fruits. Loss of total titratable acidity, ascorbic acid and initial firmness was retarded by 1-MCP (20 ppm). Preharvest bagging was effective in controlling Apple mango 'rust'. However, postharvest 1-MCP treatment was not effective in improving the postharvest shelflife of Apple mango harvested 168 DAB.