

**Title** Aspects of mango (*Mangifera indica* L.) fruit rind morphology and chemistry and their implication for postharvest quality

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### **Abstract**

Cultivation of mangoes in South Africa is of strategic economic importance. Competitive export markets require horticultural practices that meet international regulations concerning cultivation, pest control and maintenance of fruit physiology during export. Cost effective and successful implementation of such practices, however, depends on detailed and science-based knowledge of the commodity concerned. This study of the epicuticular surface of mango fruit has described the ontogeny, morphology and some chemical aspects thereof. Contributions from this study include the following findings: (1) Ontogeny and morphology of mango fruit wax: This study found that the highly intricate wax crystalloid structures were not strictly cultivar dependant. A complex series of events constitutes epicuticular wax development. The development of epicuticular crystalloids is accompanied by considerable changes in cutin and epidermal cell morphology. (2) Morphology of mango lenticels: An unusual morphology with some cultivar dependent lenticel characteristics was described. Past attempts at management of lenticel discolouration were placed in perspective by establishing the cosmetic nature of the condition. It was found that the density and distribution of epicuticular wax contribute to morphological characteristics of lenticels of individual cultivars. (3) Chemical characterisation of mango fruit wax: The chemical complexity of the dual layered epicuticular wax of mango fruit was established by this study, and the validity of interchanging Raman spectroscopy and Fourier transform infrared spectroscopy as investigative techniques established. (4) Chemical profiles of discolouring lenticels: Lenticel discolouration develops as a superficial, stress-related self-defence mechanism, as was shown through use of combined chemical and visualisation techniques. (5) Impact of some pre- and postharvest practices on mango fruit wax, highlighting the interdependence of management and fructosphere dynamics: (a) Preharvest treatment of mangoes with uncalcined kaolin. Sunburn is an economically important problem in all fruit and vegetable crops. This study has showed that solutions to contain the problem can, however, not be transferred between crops without scientific knowledge of the physiological impacts and long term repercussions

thereof. (b) Effect of mechanical handling on the fruit epicuticular wax and commercial wax coating. Physical and chemical impacts from the packline bring about progressive, irreversible changes, necessitating strict management and process control.