Courage is the thing. All goes if courage goes.

J.M Barrie (1935 -)

Author

Resumè

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

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As the second most popular fruit world-wide, 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. The implementation of such practices, however, cannot be cost effective and successful without detailed and scientific-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:

- 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.
- Morphology of mango lenticels: An unusual morphology with some cultivar dependent lenticel characteristics was described. Exhaustive past attempts at management of the manifestation of the economically important 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.
- 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.

- Chemical profiles of discolouring lenticels: The development of lenticel discolouration as a stress-related self-defence mechanism was shown through use of combined chemical and visualisation techniques. This study confirmed the superficial nature and self-defence role of discoloured lenticels.
- Impact of some pre- and postharvest practices on mango fruit wax:
  Not only postharvest, but also preharvest management of mango fruit must consider the epicuticular membrane as part of the fruit-atmosphere interface. Maintaining a balance between them depends on a better understanding of the interdependence of management and fructosphere dynamics. Both a preharvest and a postharvest practice were studied:
  - 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.
  - Effect of mechanical handling on the packline and commercial wax coating.
    Physical and chemical impacts from the packline bring about progressive, irreversible changes to the fruit epicuticular wax. To benefit from these changes, strict management and process control must be practiced.

Research outputs

PRESENTATIONS AND POSTERS

Du Plooy, W. & Korsten, L. 2001. Total quality management systems for food production in South Africa. 39th Annual Congress, *Southern African Society for Plant Pathologists*, Poster, Greenway Woods, Witrivier, 21 - 24 January.

Du Plooy, W., Van der Merwe, C. & Korsten, L. 2002. Effect of Commercial Packline Treatments on the Epicuticular Layers of Mango. *15th International Congress for Electron Microscopy*, Presentation, Durban, 1 - 6 September.

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Du Plooy, W., Prinsloo, L., Van der Merwe, C. & Korsten, L. 2003. Spatial identification (using SEM) and characterisation (using RAMAN and FTIR spectroscopy) of epicuticular wax from mature mango fruit. 42nd Annual Congress, *Microscopy Society of Southern Africa,* Presentation, Cape Town, 3 - 5 December.

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Du Plooy, W., Van der Merwe, C. & Korsten, L. 2003. Ontwikkeling en morfologie van die epidermale laag van mango vrugte, insluitend 'n ondersoek na lentiselstrukture. *S. Afr. Mango Grower's Assoc. Res. J.* 23: 114-121.

Bezuidenhout, J.L.J., Robbertse, P.J., Van der Merwe C.F. & Du Plooy, W. 2003. Lentisel verkleuring op die vrugte van Tommy Atkins- en Keitt mango's. *S. Afr. Mango Grower's Assoc. Res. J.* 23: 122-131.

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Du Plooy,W., Joubert, V. & Botha, B. 2005. Following our noses - Some change in the direction of lenticel research. *S. Afr. Mango Grower's Assoc. Res. J.* 25: 10 - 14.

FEEDBACK TO THE INDUSTRY

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Du Plooy,W., Joubert, V. & Botha, B. 2005. Following our noses - Some change in the direction of lenticel research. *S. Afr. Mango Grower's Assoc. Symp.*, Presentation, Tzaneen.

ARTICLES SUBMITTED

Du Plooy, W., Van der Merwe, C. & Korsten, L. 2005. Epicuticular changes of mango (*Mangifera indica* L.) fruit on a commercial packline, *Postharvest Biol. Technol.,* accepted.

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