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**NATURAL DEFENCE MECHANISMS IN MANGO FRUIT AND THEIR
POTENTIAL IN MANAGEMENT OF
POSTHARVEST DISEASES**

A THESIS PRESENTED BY

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To the Board of Study in Plant Sciences of the
POSTGRADUATE INSTITUTE OF SCIENCE

For the degree of

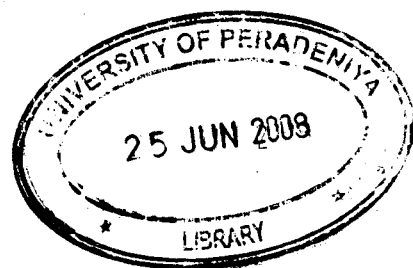
DOCTOR OF PHILOSOPHY

of the

**UNIVERSITY OF PERADENIYA
SRI LANKA**

January 2008

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NATURAL DEFENCE MECHANISMS IN MANGO FRUIT AND THEIR POTENTIAL IN MANAGEMENT OF POSTHARVEST DISEASES

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This thesis examines the constitutive defences in mango fruit in greater detail, taking into account fruit peel and latex and also the possibility of protecting fruits from postharvest pathogens by application of defence elicitors.

Unripe mango peels were extracted and partitioned to obtain a dichloromethane phase and an aqueous methanol phase. Unreported antifungal activity was detected in the aqueous methanol phase of the mango peel extract. TLC guided fractionation of the active component and HPLC analysis established the activity to be due to a mixture of several gallotannins.

HPLC of the dichloromethane phase of mango peel extracts confirmed the presence of 5-(12-*cis*-heptadecenyl) resorcinol and 5-pentadecyl resorcinol in Sri Lankan cultivars. Two additional peaks were present in the HPLC chromatograms which showed general features of the spectrum for resorcinols. One was thought to be due to a resorcinol and the other due to a derivative of a resorcinol.

Mango latex can be separated into an oily phase and an aqueous phase. The oily phase of latex is reported to contain resorcinols. Conidia of *C. gloeosporioides* lyzed when exposed to the undiluted aqueous phase of mango latex suggesting the presence of chitinase. The presence of chitinase was confirmed by a gel diffusion assay using glycol chitin as the substrate.



The role of the above defences in regulating differential resistance to postharvest anthracnose was examined using six Sri Lankan mango cultivars. 'Willard' and 'Petti', were more susceptible while 'Kohu' and 'Rata' were moderately so and 'Karutha Colomban' and 'Gira' were less susceptible. One or more of the constitutive defences discussed above were present in higher amounts in the more resistant cultivars as opposed to the more susceptible cultivars.

Infection of unripe mango fruit by *C. gloeosporioides* elicited prompt defences. Browning and accumulation of tannins was observed in cells beneath sites of attempted penetration. However, cells remained viable for up to 24 hours after infection. Chitinases, cell wall bound phenols and peroxidases were induced in infected tissue.

The possibility of inducing fruit resistance with the use of elicitors and fertilizer was investigated. Salicylic acid and Bion® applied as postharvest sprays significantly reduced anthracnose. In pre-harvest treatments, the development of anthracnose in inoculated harvested fruits was best reduced (65 to 95%) in the fruits treated at mid fruit-fill. Chitinase and phenols were induced in the salicylic acid treated fruits while gallotannin activity was not significantly different among treatment and the control. Stem-end rot was significantly less in mango fruit harvested from trees treated with three times the Department of Agriculture recommended dose of potassium while anthracnose was best reduced by applying the recommended regime of fertilizer. Gallotannin activity was increased in the high potassium treatments but not significantly.

The study established that the mango fruit has several constitutive defences in addition to resorcinols. Elicitors and potassium fertilizer can enhance fruit defences and thereby reduce major postharvest diseases of mango.