DEFENCE STRATEGIES IN UNRIPE MANGOES IN RELATION TO DEVELOPMENT OF POSTHARVEST FUNGAL PATHOGENS

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Constitutive resistance mechanisms of plants can operate at structural, biochemical or chemical levels. In mango, 5-substituted resorcinols present in the peel and non-aqueous phase of latex have been reported to play a defensive role. Previously, we have shown that phenolic substances are present in mango peel and their concentration is enhanced following infection. We also identified a group of new phytoanticipiens from the aqueous methanol phase of mango peel extract as a mixture of galloyl tannins. The present study was aimed at obtaining an overall picture of the mango fruit defence system, considering '*Rata amba*', a relatively resistant cultivar to anthracnose and '*Willard*' a more susceptible cultivar.

The two cultivars were inoculated with conidia of *Coletotrichum gloeosporioides* (10^5/ml) and disease development was quantified. Galloyl tannin activity in the peel was assessed using TLC *Cladosporium* bio-assay. The presence of chitinase in mango latex was investigated by directly subjecting mango latex to a gel diffusion assay. To determine the molecular weight of chitinases, SDS-PAGE was performed on the aqueous phase of mango latex. To further confirm the presence of Chitinase, a conidia digestion assay was carried out on conidia of C. *gloeosporioide.* A chitin-based cell wall and *Rhizopus* sp. which has chitosan in its cell wall was used for this assay. Using thin transverse sections of peel the cuticle thickness, number of latex canal perforations in the peel and depth from peel to latex canals were determined under light microscopy, as structural defences.

Inoculation studies proved that the cultivar '*Rata*' is more resistant than '*Willard*'. Antifungal activity was higher in '*Rata*' compared to 'Willard'. In the gel diffusion assay, the aqueous phase of mango latex showed chitinase activity and SDS-PAGE showed the presence of two similar high molecular weight chitinases, between 66 and 116 kDa. Chitinase activity was higher in '*Rata*' than '*Willard*'. An average of 71 % of conidia of *C.gloeosporioides* lysed after 5 1/2 hours exposure to undiluted aqueous phase of latex. However, conidia of *Rhizopus* sp. failed to undergo lysis under identical conditions. Anatomical studies indicated that the cuticle thickness, number of latex canal openings to be higher in the peel of '*Rata*' than 'Willard' while the depth from surface of peel to latex canals was less.

Antifungal compounds are directly toxic to fungi while chitinases can hydrolyze chitin in the cell walls of invading fungi. The two main postharvest pathogens of mango, *C. gloeosporioides* causing anthracnose and *Botryodiplodia theobromae* causing stem-end rot contain chitin in their cell walls. Thicker cuticle could make initial penetration more difficult. A greater abundance of latex canals makes latex more accessible for digestion of fungi. We have also previously reported that treatment of mangoes with defence inducers such as Bion and salicylic acid enhanced chitinase activity and phenols in the peel and resistance to disease. Furthermore, latex retention following harvest reduced postharvest disease in mango.

Financial assistance by ACIAR, Australia, Grant No. AC/ACIAR/RG/01 is acknowledged.