INDUCED DEFENSE RESPONSES IN UNRIPE MANGO FOLLOWING *COLLETOTRICHUM GLOEOSPORIOIDES* INFECTION AND TREATMENT WITH CHEMICAL ELICITORS

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Anthracnose in ripe mango fruits originates from quiescent *Colletotrichum gloeosporioides* infection in unripe fruits. Quiescence has been attributed to preformed antifungal, 5-substituted resorcinols, present in the unripe fruit peel, which decline during ripening. Previous studies carried out by us have indicated that latex present in unripe fruits, which disappears during ripening may be a factor determining quiescence. Mango fruit peel also contains gallotannins which show antifungal activity. The concentration of these however, does not seem to decline during ripening, hence, are probably not important in quiescence. The possibility of inducing resistance to mango anthracnose was investigated using salicylic acid (SA) and Acibenzolar-S-methyl (Bion®), which are known to have elicitor activity on a range of commodities.

The concentrations used in the study ranged from 0 to 1600 mg/l for SA, and 0 to 200 ppm for Bion®. In the laboratory, elicitors were sprayed on harvested fruits of mango cultivars '*Rata*', '*Willard*' and '*Karuthacolomban*', and maintained in moist chambers for 72 hours, prior to inoculation with *C. gloeosporioides*. In addition, SA was used as a pre-harvest field spray treatment. Fruits at fully mature stage or those at mid-fruit-fill were sprayed while still on the tree with 100 mg/l or 500 mg/l of SA or water (as the control). Spraying was done twice, with two weeks interval between sprays. Fully mature fruits were harvested one week after the final spray while fruits at mid-fruit-fill were harvested after four weeks. After harvesting, fruits were inoculated with *C. gloeosporioides* and disease development was assessed.

Browning of cells beneath the site of infection by *C. gloeosporioides* was observed 3-4 days after inoculation in unripe fruits, without any chemical treatment. Histochemical tests with 0.5 % Evans blue indicated the cells were alive. Staining with 0.05 % Toludine blue in citrate buffer showed that browning was due to high levels of phenols. Spectrophotometric studies have shown that initial total phenol content in *C. gloeosporioides*-inoculated unripe peel tissue to be higher than that of healthy tissue, that declined with ripening and visible lesion development. Laboratory studies on harvested fruits indicated that SA at 500 mg/l reduced anthracnose significantly in cv. '*Rata*' and '*Karuthacolomban*' and at 1000 mg/l level in '*Willard*'. Bion® was most effective at 50 ppm for all cultivars tested. In the field trial, anthracnose development was reduced by about 60% when treated with 500 mg/l SA in fruits treated at mid-fruit-fill. 100 mg/l SA was more effective on mature fruits and reduced disease by about 30%. A spore germination assay indicated that SA was not directly toxic to *C. gloeosporioides* at the concentrations used. Increase in antifungal activity was not detected in SA treated fruits by a *Cladosporium* bio-assay. However, an increase in chitinase activity was detected in SA treated fruits in a gel diffusion assay. Further more, an increase in total soluble phenols was noted without cell browning.

These investigations suggest that in addition to pre-formed defenses, induction of defense is possible in mango fruit, and this may be enhanced by the use of chemical elicitors.