Title Biological stimulation of phytoalexin synthesis, as an approach for controlling anthracnose disease in aubergine

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Abstract

A market survey conducted in Kandy area revealed that approximately 14% losses occur in aubergine after harvest. Anthracnose caused by *Collectotrichum capsici* was identified as a major postharvest disease in aubergine and Phomopsis rot and Fusarium rot were also encounted during the survey. Investigations were conducted to examine the possibility of inducing resistance in aubergine against anthracnose disease using relatively a weaker pathogen, *Fusarium solani*. Enhancement or inducing resistance mechanism could have a potential for controlling postharvest diseases and sere as an alternative approach for fungicides.

C. capsici develops anthracnose lesions in both wounded and unwounded aubergine and the lesion development was observed to be faster in the wounded fruit. *F. solani*, however, caused lesions only when the fruits were inoculated after wounding. *C. capsici* could initiate progressive rots in wounded aubergine several days earlier than *F. solani*. Treatment of wounded sites with conidia of *F. solani*, at least two days prior to inoculation with *C. capsici* delayed anthracnose development by six days compared to controls treated with sterile distilled water. Co-inoculation with conidia of both fungi did not slow down *C. capsici* rotting.

When *C. capsici* was grown on agar medium together with *F. solani*, the growth neither *C. capsici* nor *F. solani* was affected. Also in vitro germination studies indicated that the germination of conidia or appressoria formation of *C. capsici* was not affected by the presence of conidia of *F. solani*. These observations confirm that *F. solani* has no antagonistic effect on *C. capsici*.

Ethyl acetate extracts of peel tissue obtained from aubergines two days after inoculation with conidia of *C. capsici* or *F. solani*, when bio-assayed on TLC plates with either *C. capsici* or *Cladosporium cladosporioides* showed one prominent antifungal zone at Rf value 0.70. Similar extracts from health tissues did not show any antifungal activity inoculation of aubergine with either pathogen after wounding resulted in accumulation of more phytoalexin than the fruits inoculated without wounding. In both the phytoalexin concentration increased progressively with the increase of period after inoculation. The concentration of phytoalexin accumulated in fruit tissues inoculated with *F. solani* was significantly greater at all incubation periods than in the tissues obtained from fruits inoculated with *C. capsici*. Further, the *F. solani* inoculated fruits contained more phytoalexins at early incubation times compared with the tissues inoculated with *C. capsici*. The results showed that the pre-inoculation of aubergine with *F. solani* result in greater

phytoalexin acculmulation, which is sufficient to prevent the lesion development by *C. capsici*. *F. solani* appears to be a more effective elicitor of host natural resistance than *C. capsici*. The mechanism of indyction aubergine resistance due to inoculation with *F. solani* appears to be associated with phytoalexin accumulation. Purification of phytoalexin using flash chromatography showed that the major compound as lubimin. It can be concluded that the natural resistance in aubergine against *C. capsici* could be induced using a weaker pathogen, *F. solani* and phytoalexin accumulation appears to be a mechanism of induced resistance.