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Potential of Pathogen-Derived Immunity Inducers to Manage Southern Blight Caused by *Sclerotiumb bolfsii* in Selected Horticultural Crop Species as a Greener Approach of Disease Management

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Abstract

Pathogen-derived molecules, when applied exogenously to the plants, are recognized by the host plant receptor proteins and in response to the recognition, defence-related activities in the host plant are triggered. Therefore, use of pathogen-derived immunity inducers is a greener and safer alternative to pesticides and live biological control agents in plant disease management. The present study aimed to determine the efficacy of different types of pathogen-derived molecules in managing Southern blight caused by *Sclerotiumb rolfsii*. In a plant house experiment, seven horticultural crop species, namely, pumpkin (var. Moragollagama), luffa (var. LA33), tomato (var. Rajitha), chilli (var. MI 2), bean (var. Malaysian cittimurunga), eggplant (var. Lenairi) and capsicum (var. CA8) were tested. As pathogen derived molecules, non-viable *S. rolfsii* mycelia (prepared by oven drying, moist heating and freezing of the pathogenicity-confirmed *S. rolfsii,* isolated from an infected melon plant) and fragmented DNA of the pathogen were used. Oven dried, moist heated and frozen mycelia of the pathogen were used at concentrations of 0.002 g/mL, 0.025 g/mL, and 0.025 g/mL, respectively. The concentration of fragmented DNA of the pathogen used was 50ng/mL. Twelve plants of each species, maintained as three replicates were treated with 12 mL of the preparations of the pathogen-derived DNA and mycelia. The plants under pathogen-derived preparations were inoculated with the mycelia disks of *S. rolfsii* at the base of the seedling, three days after treatment while maintaining a positive (i.e., inoculated only with the pathogen) and a negative control (i.e., no pathogen inoculation and no treatment with pathogen-derived molecules). Disease incidence was quantified and according to a disease scale ranging from 1-4, severity of the lesion development on the stem was recorded to calculate percentage disease index (PDI). On the 5th day after inoculation of the pathogen, a significant difference in the percentage of disease incidence among the treatments was reported only in bean, luffa, pumpkin and brinjal ($p<0.05$). Capsicum variety did not develop symptoms over the observation period. Bean, pumpkin, luffa, and chilli significantly reduced PDI when treated with the pathogen derived DNA and non-viable mycelial preparations ($p<0.05$). For luffa, PDI was significantly reduced when treated with the fragmented DNA and oven dried mycelia, though all types of pathogen-derived preparations significantly reduced the PDI in bean, pumpkin and chili demonstrating no significant difference among each type of preparations. Fragmented DNA (<1500 bp) when applied as a foliar application was effective in reducing the disease severity in all the tested crop species.

***Keywords**:* Biological elicitors, Percentage Disease Index