Management of Southern Blight of Watermelon Caused by *Sclerotium rolfsii* using Fragmented DNA and Non-Viable Mycelia of the Pathogen

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Southern Blight (SB) is caused by the soil-borne fungus *Sclerotium rolfsii*. As a biological control strategy, host plant immunity can be triggered by exogenous application of molecular patterns associated with pathogens. Such Pathogen Associated Molecular Patterns (PAMPs) act as biological elicitors in inducing host plant immunity. The present study aims to determine the potential of DNA and non-viable mycelial fragments of *S. rolfsii* to manage SB and synthesize host defense enzymes towards induced plant immunity. Genomic DNA of *S. rolfsii* was fragmented by chemical and physical methods and the viability of the pathogen was inactivated by dry heat, moist heat, UV radiation and freezing. Loss of viability of *S. rolfsii* was confirmed *in vitro* and *in vivo*. Watermelon seedlings (var. Sugar baby) were treated with non-viable mycelial fragments (0.1 g/seedling) of *S. rolfsii*, subsequently inoculated with *S. rolfsii* and after seven days, percentage disease incidence (DI) was calculated. Separate sets of seedlings were applied with suspensions of DNA and non-viable mycelial fragments, having concentrations of 784 ng/µL and 0.04 g/mL, respectively. Activity of defense enzymes (i.e. peroxidase, polyphenol oxidase and chitinase) was quantified four days after the treatment. Pathogen-inoculated seedlings treated with DNA or mycelial fragments, reported less than 22% DI in comparison to 60% DI in seedlings only inoculated with the pathogen. Defense enzyme activity is significantly higher ($P<0.05$) in seedlings treated with DNA and mycelial fragments than the untreated controls. The highest chitinase activity was reported by the seedlings treated with fragmented DNA and frozen mycelial fragments. Fragmented DNA and dry-heated mycelial fragments, respectively resulted in the highest peroxidase and polyphenol oxidase activities. Results revealed the possibility of using DNA and non-viable mycelial fragments of the *S. rolfsii* to reduce SB of watermelon and enhance plant defense enzymes.

Keywords: Elicitors, Fragmented DNA, PAMP, Pathogen-triggered immunity

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