

Exploration of cellulolytic fungi as seed treatment agents against causal organisms of damping off disease in Tomato

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Cellulolytic fungi have shown promising results in agriculture for plant growth promotion by facilitating enhanced germination of seeds, rooting, and suppression of plant diseases, thus been used in hazard free and sustainable agriculture. Damping off caused by *Pythium* sp., *Phytophthora* sp., *Rhizoctonia solani* and *Fusarium oxysporum*, is considered as the most severe nursery disease in tomato. In the current study, cellulase activity of five selected cellulolytic fungi namely *Talaromyces* sp., *Trichoderma* sp., *Aspergillus niger*, *Aspergillus* sp. and *Penicillium oxalicum* as well as their dual, threesome, foursome and fivesome combinations were tested. The highest cellulase production was recorded by co-culture between *Talaromyces* sp., *Aspergillus* sp. and *Penicillium oxalicum*. Efficiency of this co-culture as a seed treatment agent against damping off causing pathogens was also investigated. Both experiments were laid in completely randomized design with three replicates. The co-culture was found to be effective in enhancing emergence percentage of tomato seedlings against *F. oxysporum* (t value = 0.0056), *Phytophthora* sp. (t value = 0.0280), and group of all four pathogens (t value = 0.0201). Efficacy of the seed treatment agent on mixture of all four pathogens may have occurred due to *Rhizoctonia solani* being inhibitive towards other three pathogens as revealed by a paired interaction test between fungal pathogens. The same crude extract was also effective in reducing damping off incidence against *Phytophthora* sp. (t value = 0.0001). The study concludes that combination of *Talaromyces* sp., *Aspergillus* sp. and *Penicillium oxalicum* has a promising potential in suppression of *Phytophthora* sp. in reducing damping off disease in tomato.

Keywords: Cellulolytic fungi, Damping-off, Seed treatment, Tomato