



Induction of defense mechanisms involved in disease resistance of onion blight disease caused by *Botrytis allii*.

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Abstract:

Abstract *Botrytis umbel* blight caused by *Botrytis allii* is a major disease that attacks onion crop. In vitro, *Trichoderma viride*, *Penicillium chrysogenum*, and *Saccharomyces cerevisiae* and extract of bitter apple fruits (*Citrullus colocynthis*) showed antagonistic effect and inhibited the mycelial growth of *B. allii*. Gas chromatography-mass spectrometry (GC-MS) analysis of bitter apple fruits showed the existence of 37 compounds and their derivatives. Among them, 10 compounds constituted 58.66% of the total analyses. Greenhouse experiment approved that the extract of bitter apple fruits was the most effective in reducing disease incidence and severity, followed by *P. chrysogenum*, when they were applied 2 days pre-inoculation with the pathogen. All treatments significantly increased the total phenolic contents than the untreated control, but the highest increase was obtained when *S. cerevisiae* and *P. chrysogenum* were applied. A positive correlation was found between the activity of bioagents and improvement of peroxidase and phenylalanine ammonia-lyase enzymes in onion plants to resist infection with the pathogen. *P. chrysogenum* caused the highest increase in polyphenoloxidase activity in infected onion plants, while *S. cerevisiae* showed the lowest level of this enzyme. The study approved that application of the bioagents not only protected the onions against *Botrytis* disease but also enhanced the content of antioxidant compounds in onions. This encourages the application of such preparations to manage the production of onion crop, especially in the organic farming that bans the application of any chemicals.

Keywords:

Keywords: Antioxidant enzymes, Bioagents, Bitter apple fruits, *Botrytis allii*, Onion

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