

## BIOCONTROL OF *PHASEOLUS VULGARIS* ROOT ROT USING ARBUSCULAR MYCORRHIZAE

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### Abstract

The arbuscular mycorrhizal fungi (AM fungi) as mixture of *Glomus* spp. was used to induce resistance in *Phaseolus vulgaris* against root rot disease caused by *Rhizoctonia solani*. Results showed that % disease incidence was significantly reduced in AM-inoculated plants as compared with infected and AM-free control. Production of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) and level of lipid peroxidation increased in both roots and shoots bean plants with increasing the time of infection. AM fungi markedly alleviated oxidative stress in infected bean plants, thus, levels of H<sub>2</sub>O<sub>2</sub> and lipid peroxidation was markedly reduced. Also, activity of antioxidant enzymes (catalase, ascorbate peroxidase and superoxide dismutase) significantly increased in bean tissues in response to both *R. solani* and/or AM fungus. The highest enzyme activity was recorded in shoots of 14 days old plants inoculated with AM fungi. Total phenolic compounds and various phenolic acids especially cinnamic and ferulic acids greatly increased in roots of bean plants infected with *R. solani* and/or inoculated with AM fungi. However, coumarin was found only in AM-treated plants. But quercetin markedly increased in bean roots infected by *R. solani* and decreased in AM-treated plants, as compared with non-infected control. Finally, activity of lignification enzymes (polyphenol oxidase, peroxidase and phenylalanine-ammonia lyase) increased in all infected plants. Our results indicate that AM fungi increased resistance in infected bean plants by inducing both antioxidant system and phenolic compounds pathway.

**Key words:** AM fungi – *Rhizoctonia solani* – *Phaseolus vulgaris* – antioxidant enzymes – phenolic compounds