

Biological Control of Fusarium Root and Crown Bean Cares in Tarom Zanzan Township Using Antagonistic Bacteria

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Fusarium root rot of bean is one of the most important fungal broad bean disease in Iran and the world. Sampling of broad bean plants with wilting symptoms in Tarom township of Zanzan province revealed that Fusarium oxysporum is the most important soil-borne pathogen in broad bean. Due to the problems caused by the use of fungicides in the control of damage to soil-borne pathogen, this study aimed to evaluate the efficacy of several different strains of bacterial rhizosphere area in controlling the damage of broad bean Fusarium rot in laboratory and greenhouse. Two strains of bacteria called Pseudomonas fluorescens (P-108 and P-145-1) and two strains of Bacillus subtilis bacteria including Bacillus subtilis Germany and B.S.B.G03 and one strains of Herbasprillium spp. bacteria, one isolate of Rhizobium spp. bacteria named R-184, developed the Soil and Water Research Institute of Iran. In addition, 10 strains of Pseudomonas fluorescens which isolated soil of rhizosphere area of broad bean were also obtained Islamic Azad Laboratory of Rasht. The inhibitory property of these bacterial strains was investigated based on the formation of inhibition zones and the efficiency of antibiotic secretions in vitro. Then, the efficacy of these strains in controlling root fusarium rot was evaluated at greenhouse level. Seeds treated with antagonistic bacteria were cultured in a pot in contact with colonies of F. oxysporum and root infection was assessed one month after planting. Statistical analysis of the results using SAS software indicated that the efficiency of the studied strains was significant at 1% level. B.s.B.G03, P-108 and P-145-1 isolates had the highest antibiotic activity and inhibition of pathogenic fungus, respectively. The B.S.B.G03 strain was the best isolate studied in this research and completely prevented of root rot of broad bean casued by Fusarium fungus in the greenhouse. The results of the greenhouse section were consistent with those obtained the in

vitro section and confirmed. Those strains which had inhibitory effect on the artificial medium had good results in the natural medium and in the greenhouse. However, the only strain that completely prevented root and crown rot of broad bean and increased growth of aerial parts and foliage of broad bean was B.S.B.GO3 antagonist strain that had definitive results. The results of the current study suggested that it can be hoped that antagonistic bacteria will be able to biologically control Fusarium root and crown rot of broad bean.

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