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Title: Antagonistic effect of Trichoderma for resistance against Fusarium wilt in Chickpea (*Cicer arietinum* L.)

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Abstract: Chickpea provide high quality protein to large population sectors in South and West Asia, and the Mediterranean Basin. This crop has a significant role in farming systems as substitute for fallow in cereal rotations. Fusarium wilt, caused by the soil borne fungus *Fusarium oxysporum* f. sp. *ciceris*, has become a major factor limiting chickpea production worldwide. The pathogen long survival in soil and high pathogenic variability, with eight races 0, 1A, 1B/C, 2, 3, 4, 5, and 6 having been identified so far, are key elements in the development and management of the disease. The antagonistic activity of *Trichoderma* against *Fusarium oxysporum* were examined on potato dextrose agar plates by dual culture method. The results revealed that, all the antagonists showed inhibitory effect on growth of the test fungus and were effective in controlling the growth of pathogen. There were two species of *Trichoderma*, *Trichoderma harzianum* and *Trichoderma viride*, and these two strain was selected for the analysis. Among the two strains of *Trichoderma viride* was found to be most effective in inhibiting the growth of *Fusarium oxysporum* of about 35 and 57.124 per cent growth of test fungus on 3th and 7th day respectively, whereas *Trichoderma harzianum* inhibited 12.5 and 20 per cent on 3th and 7th day respectively. The results revealed that *Trichoderma viride* species were found effective against *Fusarium oxysporum* and thus *Trichoderma viride* were selected for infecting the chickpea seedlings. The antagonistic effect of *Trichoderma* was studied with biochemical analysis of anthocyanin, proline, Antioxidant enzyme assay, Lipid peroxidation and molecular analysis of total protein in contrast to control. The data so obtained shows an increase in anthocyanin, proline, Antioxidant enzyme activity and protein content of treated as well as recovered plant however insignificant change in ROS activity was observed.. Molecular estimation of total protein content was also performed. The quantified protein so obtained shows a decrease in concentration of protein in treated plants as compared to control. As per our analysis the treated as well as recovered plant were transfer from in vitro to in vivo condition are found to be still healthy which shows the antagonistic effect of *Trichoderma viride* against *Fusarium* f. Sp *ciceris*..Our study revealed that the biological control agent such as *Trichoderma* can be useful component of integrated Chickpea Fusarium wilt management.

Description: Antagonistic effect of *Trichoderma* for resistance against Fusarium wilt in Chickpea (*Cicer arietinum* L.)

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