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Effects of Different *Trichoderma harzianum* Strains on Growth and Production of Secondary Metabolites in *Trigonella foenum-graecum*

ZAHRA SADAT HOSSEINI¹, MAJID MAJIDIAN², TAHEREH HASANLOO¹, MOZHGAN KOWSARI¹

¹Agricultural Biotechnology Research Institute, Agricultural Research, Education and Extension Organization (AREEO), Iran

²University of Guilan, Dept. of Agronomy and Plant Breeding, Iran

Abstract

Trigonellin is one of the most potent antidiabetic so far extracted from plant sources. Influence of two *Trichoderma harzianum* isolates (chit4215MK and T8-7MK) on trigonellin production and growth factors of two *Trigonella foenum-graecum* ecotypes (Hamedan and Bandarabbas) were investigated under greenhouse conditions. The results showed that the two ecotypes are different in terms of growth factors. So, Hamadan ecotype showed longer stem length and Bandarabbas ecotype showed higher number of lateral branches and pod numbers. It was observed that *Trichoderma* strains have different effects on the growth of Hamadan ecotypes stem and T8-7MK strain was better than chit4215MK. However, no shoot length differences were observed between the control and *Trichoderma* treated plants for the Bandarabbas ecotype. The data revealed that, there was no significant difference between ecotypes, treatments and the interaction effects of treatment and ecotypes for peroxidase activity and total soluble carbohydrate content. A significantly higher content of trigonellin ($4 \text{ mg g}^{-1} \text{ DW}$) was achieved in T8-7MK *Trichoderma* strain treated Bandarabbas ecotype that was 1.6-fold higher than the control plants. Interestingly, a significantly higher content of trigonellin ($3.5 \text{ mg g}^{-1} \text{ DW}$) was obtained in chit4215MK *Trichoderma* strain treated Hamedan ecotype that was 1.3- fold higher than the control plants. The content of trigonellin in treated Bandarabbas ecotype was higher than the treated Hamedan ecotype (1.3 times more). It was showed that treatment with *Trichoderma* can be able to regulate trigonellin biosynthes and different strains have different effects on different fenugreek ecotypes.

Keywords: Fenugreek, growth, secondary metabolites, *Trichoderma harzianum*