

Abstract

Development of a Biological Control Strategy against Fusariosis and Rabies of Fuentesauco-Chickpea (PGI) through the Use of the *Trichoderma* Fungus [†]

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Abstract: The Protected Geographical Indication (PGI) Fuentesauco-Chickpea (F-C) includes a legume crop developed in the south of the province of Zamora (Spain), of great agronomic, economic, and cultural importance for the area, as well as gastronomically on a global scale. Its cultivation is mainly affected by the fungal diseases called fusariosis (caused by *Fusarium oxysporum* f. sp. *ciceri*) and rabies (caused by *Ascochyta rabiei*). Through an in vitro antagonism study, we were able to select the species *Trichoderma atroviride*, *T. hamatum*, *T. harzianum*, and *T. koningii* as the most effective against both pathogens, thanks to mechanisms of action such as mycoparasitism, antibiosis, and/or competition for space and/or nutrients. Subsequently, these four species were used in studies with F-C plants and both pathogens, inoculating *Trichoderma* radicularly. Using this methodology, we described how *T. atroviride* and *T. koningii* were able to control *F. oxysporum* f. sp. *ciceri* both directly and by activating plant defenses, in the case of *T. koningii*. On the other hand, the species *T. harzianum* and *T. koningii* were able to significantly reduce foliar infection with *A. rabiei*, by activating systemic plant defense responses. Regarding the productivity of F-C, the species *T. hamatum* and *T. koningii* were able to significantly increase the formation of grains in each plant. Therefore, *T. koningii* is capable of controlling both pathogens under greenhouse conditions, in addition to increasing their productivity.

Keywords: *Fusarium oxysporum* f. sp. *ciceri*; *Ascochyta rabiei*; *Trichoderma*; antagonism; plant systemic resistance; *Trichoderma koningii*



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