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In vitro interactions between *Armillaria* sp. and *Trichoderma* sp. collected from mushroom crop residues

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Asbtract

Armillaria mellea (Agaricales: Physalacriaceae) is a fungus naturally occurring in the soil, which may penetrate the grapevines' roots, causing their death in the long term. Many chemical products have been tested to manage this fungus with limited success. Nowadays, uprooting and non-prolonged cultivation is the only field-allowable and effective solution. *Trichoderma* is a well-known fungus used as a biocontrol agent. However, it is also known to be a contaminating fungus for the cultivation of mushrooms (*Agaricus* sp.). We hypothesized that *T. Harzianum* from contaminated mushroom cultivation is an effective biological control agent of *A. mellea in vitro* and could be used as a treatment in the vineyard. In this sense, a circular economic model would be favored in which, on the one hand, the waste reuse from mushroom cultivation would be encouraged, and on the other hand, an effective and sustainable solution would be proposed to combat some fungal diseases. To accomplish this, field strains of *T. Harzianum* and *A. mellea* were isolated on Malt Extract Agar (MEA). Dual confrontation tests on Potato Dextrose Agar (PDA) plates were performed to evaluate the inhibitory effect of the *T. harzianum* strain on *A mellea*. For this purpose, *A. mellea* was plated 14 days before *T. harzianum*. The two fungi were also individually cultivated as positive controls. All plates were kept at 25°C throughout the experiment. We observed that *T. harzianum* inhibited the *in vitro* growth of *A. mellea*. Specifically, the *A. mellea* growth stopped when both fungi met, while *T. harzianum* continued to grow above *A. mellea*. The results obtained support our hypothesis of the potential of *T. harzianum* as a biocontrol agent for *A. mellea*. However, it must be validated in field experiments. Future research will focus on analyzing whether mushroom crop residues infected with *T. harzianum* could be reused as an organic mulch treatment against *A. mellea* in the vineyard.

Key words: Biological control, mulch, vineyard and waste reuse.