

Poster

In vitro analysis of the efficacy of fungicides and biological control agents against pathogenic fungi of strawberries.



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ABSTRACT

Strawberries are a crucial product globally, the Huelva region stands out in Spanish production, where this crop is continually threatened by soil-borne pathogens that can significantly reduce yields. To address this problem, in this area, soil disinfestation with fumigant agrochemicals has been the main strategy. However, the continued reduction in the use of certain active substances is limiting control possibilities, and disease problems persist [1,2]. For instance, charcoal rot, caused by *Macrophomina phaseolina*, is one of the most damaging diseases, with 32.9% of plots treated to control it during the 2022-2023 campaign [3].

In the present work, two in vitro approaches were evaluated for controlling fungal pathogens. The first strategy was the poisoned medium technique [4], an in vitro analysis of the efficacy of five fungicides against five strawberry pathogens: *M. phaseolina*, *F. solani*, *N. clavisporea*, and two isolates of *F. oxysporum*. This assay aimed to effectively inhibit pathogen growth through fungicide action. The lethal dose 50 (LD50) was calculated. The second one followed a biological control strategy, and was divided into two experiments. On one hand, dual in vitro confrontations were conducted between pathogenic fungi and various *Trichoderma* isolates to assess their biological control capacity [5]. On the other hand, the antagonist activity of *Trichoderma* was evaluated by cultivating on culture medium with a sterile cellophane sheet, which was subsequently removed for pathogen inoculation [6]. The objective was to identify pathogen inhibition of these antagonists by competence and/or production of inhibitory substances.

Within the framework of the in vitro strategy for fungicide efficacy evaluation, *M. phaseolina* had the most favorable results, exhibiting low LD50 doses and, in some cases, complete growth inhibition. In addition, positive effects of the fungicide composed of propiconazole and tebuconazole were also observed in all five evaluated fungi. Regarding to biological control assays, overgrowth in dual culture and high growth inhibition percentages were registered for some *Trichoderma* isolates, which could be indicative of potential as a biological control agent against these pathogens.

In summary, these findings indicate: (i) a significant sensitivity of *M. phaseolina* to the fungicides employed (ii) the potential of some *Trichoderma* isolates as alternative for controlling these pathogens.

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