

## Antagonistic studies and hyphal interactions of the new antagonist *Aspergillus piperis* against some phytopathogenic fungi in vitro in comparison with *Trichoderma harzianum*

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### Abstract

The present study represents, for the first time, the detailed studies about the hyphal interactions of *Aspergillus piperis*, as a new antagonist, against some isolated plant pathogenic fungi (*Alternaria alternata*, *Alternaria solani*, *Botrytis cinerea*, *Sclerotium cepivorum* and *Sclerotinia sclerotiorum*) in vitro. The bio-controlling capability of *A. piperis* against the tested phytopathogens was tested using the dual culture method. This experiment revealed that *A. piperis* had antagonistic activity and reduced the growth of the tested phytopathogens and grew over their mycelia in the paired plates. Also, several antagonistic mechanisms were recorded, in this study, between *A. piperis* and the tested phytopathogens using the microscopic examination. The bio-controlling activity and the antagonistic mechanisms exhibited by the new antagonist, *A. piperis* were compared with those obtained by the common antagonist, *Trichoderma harzianum* against the same phytopathogens. The obtained results showed that, *A. piperis* was more effective than *T. harzianum* in inhibiting all the tested species in the dual culture plates. The best result was 81.85% inhibition percentage against *S. sclerotiorum* by *A. piperis* while, *T. harzianum* exhibits only 45.18%. Moreover, several antagonistic mechanisms and hyphal interactions were investigated among the hyphae of both *A. piperis* and *T. harzianum* and the hyphae of the tested phytopathogens. These mechanisms were summarized as; mycoparasitism (coiling and penetration of the hyphae) and antibiosis in the form of lysis of the hyphal cells and

spores, denaturation and breaking of the hyphae. The indirect interaction (antibiosis) and the direct mycoparasitism were observed by *A. piperis* against all the tested phytopathogens, but it attacked the hyphae and conidiophores of *A. alternata* by only the antibiosis interaction. The microscopic examination revealed also that *T. harzianum* attacked the tested phytopathogens by both antibiosis and mycoparasitism except against *A. solani* which attacked only by mycoparasitism.