

## Inoculation methods for introducing the endophytic fungi *Mucor nidicola* in tomato plants, and its effect on promoting resistance to cadmium

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### Abstract

Soil pollution caused by heavy metals is a global concern that has been increasing due to industrial development and mining residues. Bioremediation is the use of living organisms to remove or neutralize pollutants from a contaminated site. Among the possible strategies, phytoremediation is the direct use of green plants and their associated micro-organisms to stabilize or reduce contamination in soils. This study analyzed the inoculation efficiency of fungus *Mucor nidicola* in tomato *Solanum lycopersicum* and its role in plant resistance to heavy metals. The fungus tested was isolated from the roots of plants from a site contaminated with heavy metals and it showed good resistance to cadmium when tested *in vitro*. First, we tested nine methodologies for the fungus inoculation on tomato plants. Then, the plant-fungus interaction was studied in the presence of cadmium to analyze the fungus as a plant resistance promoter. The inoculation techniques that applied short-time chemical scarification were not efficient and neither were the methodologies that placed a disk of the mycelium with the seed during the germination process. Spraying the plants with mycelium solution was also inefficient. The long-term chemical scarification and direct contact between seeds and sporum resulted in fungal inoculation, even though it occurred at a low frequency. The plant-fungus interaction test in presence of CdCl<sub>2</sub> confirmed the negative effect of this compound on plant development, but there was no significant effect of fungus inoculation in terms of improving plant performance in such conditions. Further research on the improvement of the inoculation technique with *M. nidicola* on tomato or other species is of great importance to enable the development of new viable phytoremediation techniques.

Brazil. She completed her masters at the age of 24, on agricultural entomology at Universidade Estadual Paulista, Brazil. Currently, she also works as a biology teacher at high school level.



### Speaker Publications:

1. Oliveira, Helena & Gomes, Guilherme & Morlin, José & Zuben, Claudio & Linhares, Arício. (2008). The Effect of Buscopan(R) on the Development of the Blow Fly *Chrysomya megacephala* (F.) (Diptera: Calliphoridae). Journal of forensic sciences. 54. 202-6. 10.1111/j.1556-4029.2008.00926.x.
2. Gomes, Leonardo & Gomes, Guilherme & Oliveira, Helena & Junior, José & Desuó, Ivan & Queiroz, Margareth & Giannotti, Edilberto & Zuben, Claudio. (2007). Occurrence of Hymenoptera on *Sus scrofa* carcasses during summer and winter seasons in southeastern Brazil. Revista Brasileira de Entomologia. 51. 10.1590/S0085-56262007000300019.

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