SUMMARY

Evaluation of the antifungal properties of silver, copper and chitosan nanoparticles against *Fusarium oxysporum* f. sp. Lycopercisi

The tomato crop *(Solanum lycopersicum* L.*)* has an annual production of 243 million tons worldwide. One of the most important etiological agents for this crop is *Fusarium oxysporum* f. sp. lycopersici, responsible for the production impairment in tomato production systems, due to the inadequate use of pesticides of a chemical nature for its control. The present study presents a possible solution through the use of nanomaterials. The purpose of this research was to evaluate the antifungal effect of silver (AgNP's), copper (CuNP's) and chitosan (CHNP's) nanoparticles against *F. oxysporum* f. sp. lycopersici at the *in vitro* level. The characterization of *F. oxysporum* f. sp. lycopersici; isolated from tomato plants was performed by microscopic morphology identifying their characteristic structures; macroconidia, microconidia, phialides and chlamydiospores. The synthesis of the nanoparticles was carried out under the principles of chemical reduction, characterizing them by Dynamic Light Scattering (DLS), Zeta Potential and Transmission Electron Microscopy (TEM). The results of the DLS test showed that the nanoparticles had a hydrodynamic range of 71.48, 1,712 and 1,198 nm, a zeta potential of -1.55 to -19.9 mV for AgNP's and 15.7 to 17.9 mV for CHNP's. For the analysis by MET, the AgNP's were observed spherical with sizes of 17.11 nm, the CuNP's were amorphous at 19.31 nm and the CHNP's presented an amorphous structure with 12.83 nm. The anti-fungal effect was determined by the percentage of inhibition of mycelial growth. The results showed that the AgNP's inhibited the growth of the fungus, only 15% with a dose of 10,500 ppm. The CuNP No inhibition was observed for the growth of *F. oxysporum* f. sp. lycopersici on the contrary, its application accelerated the growth of the fungus. The CHNPs were inhibited between 78 and 100%, with a 1,750 ug / ml dose, being the most effective. In conclusion, chitosan nanoparticles represent an efficient alternative for control and eradication of *F. oxysporum* f. sp. lycopersici.

Key words: *Fusarium oxysporum* f. sp. lycopersici, Chitosan, Nanoparticles, Nanopesticides, Tomato.