

12th Euro Biotechnology Congress

November 07-09, 2016 Alicante, Spain

Utilization of zinc oxide nanoparticles doped with silver against phytopathogenic fungi

Ileana Vera Reyes¹, Lira-Saldivar R H¹, Esparza-Arredondo I J E², Mendez-Arguello B¹, Mendoza-Mendoza E¹ and Garcia-Cerda L A¹

¹Centro de Investigación en Química Aplicada, Mexico

²Universidad Autónoma Agraria Antonio Narro, Mexico

Modern agriculture requires low impact products; metallic nanoparticles (NPs) with antimicrobial effects could serve for this purpose. For that reason the aim of this work was to analyze the effect of pure zinc oxide nanoparticles (ZnO NPs) and zinc oxide NPs doped with silver (1.25 and 2.5 % w/w), against two very damaging plant pathogenic fungi: *Fusarium oxysporum* and *Alternaria solani*, which are the main pathogens responsible for severe diseases of a large number of agricultural crops. We synthesized nanometric ZnO particles at very low-temperature by using a mechanically assisted metathesis reaction, that permitted the formation of spherical nanoparticles with mean sizes of around 20 nm. NPs characterization was accomplished by X-ray diffraction; the size and shape of the particles were studied by transmission electron microscopy (TEM). The effect of ZnO NPs and Ag-doped ZnO NPs against the fungi was done using NPs incorporated to PDA growth medium at different doses (0, 250, 500 and 1000 mg L⁻¹). ANOVA and Tukey multiple range tests were used to analyze data. The application of 1000 mg L⁻¹ concentration of ZnO NPs produced maximum growth inhibition of fungal hyphae. We also assessed the effectiveness of combining the ZnO and silver nanoparticles, however they did not exhibit a greater antimicrobial activity than pure ZnO NPs. Based on this results; it is viable that tested ZnO NPs could be used in programs of sustainable agriculture, since they are required in minute quantities by comparison to conventional pesticides.

Biography

Ileana Vera Reyes has completed her PhD from Centro de Investigación en Estudios Avanzados del Instituto Politécnico Nacional, Mexico. She is a recipient of a CONACYT Research Fellow.

ileana.vera@ciqa.edu.mx

Notes: