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PROCEEDINGS

A study by SAXS of silver nanoparticles produced by biogenic synthesis

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Nanotechnology applied to the agriculture has highlighted in recent decades, making important contributions, for example, the use of nanoparticles produced by biogenic processes to control phytopathogens. This demonstrates the need of better understand the composition, mechanisms of action and toxicity of these nanoparticles. Their capping by biomolecules, derived from the organism used in the synthesis, contributes to their stability and biological activity. In particular, previous studies demonstrated the potential of Ag nanoparticles to combat the white mold [1], a disease that affects important agricultural species. In this study, Ag nanoparticles were produced by the fungus *Trichoderma harzianum* in aqueous solutions containing silver nitrate as a precursor for the silver nanoparticles. Some of the samples were exposed to the phytopathogenic fungus *Sclerotinia sclerotiorum* responsible for the white mold. After preparation, a fraction of the samples was submitted to physico-chemical processes to remove organic cap layer on nanoparticles surface formed during the preparation process. We used the small angle X-ray scattering (SAXS) technique to determine the effects of the phytopathogenic fungus and cap removal process in the average radius, radius dispersion, and number density of the nanoparticles. The SAXS data analyses suggest that the presence of the pathogenic fungus results in a decrease in number and total volume of Ag NPs without significant changes on average radius and radius dispersion. Our results also indicate that the physical-chemical process applied to remove the organic cap surrounding the Ag NPs leads to a decrease in the fraction of the smaller nanoparticles.

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References:

[1] Guilger, M and Pasquoto-Stigliani, Scientific Reports, v.7, n.1, p.44421-44426 (2017).