

Green synthesis of silver nanoparticles with *Euphorbia tirucalli* extract and its protection against microbial decay of strawberries during storage

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Abstract

Silver nanoparticles (AgNPs) can be produced through an easy and safe process called green synthesis and have been considered an efficient antimicrobial agent. The antimicrobial effect of silver nanoparticles green synthesized with *E. tirucalli* (aveloz) can be a promising technique for preserving stored strawberries. The objective of this work was to perform a green synthesis of AgNPs with aveloz extract (Av) and evaluate its effect on the physiology and preservation of stored strawberries. Silver nitrate was reduced with Av to produce Av-AgNPs. The Av-AgNPs were characterized by Scanning Electron Microscope, Energy Dispersive X-ray Spectrometry, and laser diffraction. The *in vitro* antifungal activity of Av-AgNPs was evaluated against *Botrytis cinerea* and *Rhizopus stolonifer*. Strawberries were treated with Av-AgNPs and stored (5  C) for 12 days. Respiratory rate, decay, fresh mass loss, firmness, total phenolics and antioxidant activity of the strawberries were evaluated. According to the results, Av-AgNPs synthesis was performed, and it presented sizes between 40 and 90 nm. Av-AgNPs inhibited *B. cinerea* but was less effective for *R. stolonifer*. Total phenolic compounds, antioxidant activity, fresh mass loss and firmness of strawberries were not influenced by Av-AgNPs. Treated strawberries had a lower respiratory rate than the control and showed no symptoms of microbiological deterioration until 9 days of storage, while in the control the deterioration symptoms started after 3 days. This study showed that the green synthesis of AgNPs with Av produced nanoparticles smaller than 100 nm, and that they were effective against strawberries decay during storage, indicating to be a promising protection technique against decay.