

The benefits of adding calcium oxide nanoparticles to biocompatible polymeric coatings during cucumber fruits postharvest storage

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Abstract

Cucumber fruits commercialization is of great economic national, and global importance; however, this product suffers substantial postharvest losses, mainly due to poor and inadequate transport, handling, and postharvest storage. In this study, the application of poly(vinyl acetate-co-vinyl alcohol), P(VAc-co-VA), latex coatings added with calcium oxide (CaO) nanoparticles (NP) that have demonstrated antimicrobial activity, is reported. The experiment consisted of two controls [Control (no latex coating) and latex coating without NP], as well as the latex coatings added with CaO-NP at 50, 100, and 150 mg·L⁻¹. Cucumber fruits were grown *ad hoc*, monitoring the cultivation with corresponding cultural activities for this experiment and, once harvested, undamaged and malformation-free fruits were selected. Treatments were applied during the day of harvest and inside a cold chamber at 10 °C, where the fruits were stored. The visual quality of the fruits as well as their physical and chemical parameters were determined during the storage period every three days. The results indicated that CaO-NP coatings provided positive effects on the appearance, visual quality, pigments, and antioxidants contents of the fruits in the applied concentrations (50, 100, and 150 mg·L⁻¹). These changes allowed maintaining the quality properties of cucumbers during storage, extending the shelf-life up to 24 days postharvest. Thus, the P(VAc-co-VA) coating added with calcium oxide NP represents an alternative to postharvest treatment for cucumbers, providing higher luminosity and better visual quality, which is the main factor influencing the purchase and consumption of fruit products.