

Application of nano-silver particles to control the postharvest biology of cut flowers: A review

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Abstract

The postharvest longevity and quality of cut flowers are affected by floral senescence and petal abscission, which primarily result from both ethylene production in the floral organs (such as the petals and gynoecium) and microbial growth in the xylem vessels in ethylene-sensitive flowers, while microbial growth plays a more crucial role in ethylene-insensitive flowers. Several approaches have been proposed to improve these postharvest traits, many of which use chemicals to inhibit ethylene biosynthesis and bacterial growth. However, the use of nanotechnology in the agricultural industry has been increasing in the last decade due to its ability to increase agricultural production and reduce postharvest waste. In particular, nano-silver (NS) particles have been used as ethylene inhibitors and antimicrobial agents in packaging to extend the vase life of horticultural products (i.e., fruits, vegetable, and flowers). In this review, we outline the role of NS particles in the suppression of ethylene production and microbial growth in cut flowers and discuss how the concentration and size of NS particles, incubation time, and plant genotype affect postharvest longevity. In addition, we highlight recent results on the application of biologically synthesized NS particles in packaging and postharvest management within the horticultural industry. We expect that this review will provide useful information on the benefits of using NS particles to control the postharvest biology of horticultural products, particularly with respect to improving the vase life of cut flowers.