The combined treatment of broccoli florets with kojic acid and calcium chloride maintains post-harvest quality and inhibits off-odor production

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Scientia Horticulturae 262: 109019. (2020)

Abstract

The effect of a combination of 25 mg L^{-1} kojic acid and 10 g L^{-1} calcium chloride (KA + $CaCl_2$) on the postharvest senescence of broccoli was investigated, along with potential modes of action. Results indicated that the KA + $CaCl_2$ treatment of broccoli florets maintained their sensory evaluation scores, inhibited yellowing of florets, and generally prolonged shelf-life. The KA + $CaCl_2$ treatment decreased the rate of respiration, ethylene production, and inhibited the degradation of chlorophyll. Furthermore, the relative gene expression and enzyme activity of ascorbate peroxidase, peroxidase, and catalase were elevated, and the expression of genes (*BoCHL1*, *BoCHL2*, *BoCHL3*, *BoPAO*, and *BoPPH*) involved in chlorophyll degradation were down-regulated. KA + $CaCl_2$ also maintained the production of the characteristic volatiles produced by broccoli florets as measured with the use of an electronic nose. Results of the present study provide new insights into the ability of KA + $CaCl_2$ to inhibit the postharvest senescence of broccoli florets and extend their shelf-life.