

Title Expression of a lipoxygenase encoding gene (*BoLOXI*) during postharvest senescence of broccoli

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Citation Postharvest Biology and Technology, Volume 64, Issue 1, February 2012, Pages 146-153

Keywords Broccoli; Senescence; Postharvest; Lipoxygenase

Abstract

Lipoxygenases (LOX) belong to a large family of plant enzymes that catalyze the hydroperoxidation of polyunsaturated fatty acids. Most of them are expressed during senescence and contribute to membrane deterioration and biosynthesis of jasmonic acid, a known senescence enhancer. In this work, we cloned a fragment of a gene encoding a LOX from broccoli (*BoLOXI*). The analysis of the sequence revealed that *BoLOXI* is closely related to other LOX from higher plants. Furthermore, we analyzed the expression of *BoLOXI* and detected a larger increase during postharvest senescence. A slight increase of total lipoxygenase activity was also found during senescence. In other sets of experiments, broccoli heads were treated with plant hormones, such as cytokinin and ethylene, as a way to assess the effect of such compounds on the expression of *BoLOXI*. Cytokinin treatment delayed the increase of *BoLOXI* expression and lipoxygenase activity whereas ethylene accelerated both processes. Also, several postharvest treatments were applied in order to delay senescence in broccoli florets and to evaluate their effects on *BoLOXI* expression. Samples treated with modified atmosphere, hot air, UV-C or white light showed a delay in chlorophyll degradation and degreening. In most cases, the treatments also delayed the increase of *BoLOXI* expression, reaffirming the relationship between the expression of this gene and senescence. However, treatments like modified atmospheres and visible light markedly increased lipoxygenase activity, which suggests a lack of correlation between *BoLOXI* expression and lipoxygenase activity.