

**Title** Effects of postharvest ethanol vapor treatment on expression of genes involved in broccoli senescence

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### **Abstract**

Broccoli (*Brassica oleracea* L. Italica group) senesces rapidly after harvest at room temperature. Ethanol vapor treatment with ethanol pads suppresses senescence of harvested broccoli. In order to comprehensively understand the effects of ethanol vapor treatment on various senescence processes, the expression of genes involved in senescence in harvested broccoli treated with ethylene and/or ethanol were analyzed. Broccoli branchlets were packed in a perforated polyethylene bag with or without ethanol pads and continuously exposed to ethylene or not at 20degC in darkness. The levels of BoINV2 increased during storage in broccoli treated without ethanol and without ethylene. Ethylene enhanced the gene expression, which was eliminated by ethanol treatment. The levels of BoCAR1-5, BoMT1, BoCP5, and BoSPT1 increased in broccoli treated without ethanol, but no acceleration induced by ethylene was observed. In ethanol-treated broccoli, the levels were suppressed relative to those of broccoli treated without ethanol. The levels of BoAPX1 in both groups of broccoli treated with ethanol tended to be slightly lower than those of broccoli treated without ethanol. No significant changes were observed in any of the treatments with regard to BoGDH. These results suggest that ethanol vapor treatment of harvested broccoli suppressed the expression of genes involved in senescence, leading to suppression of various senescence processes.