

Title Effects of postharvest ethanol vapor treatment on ethylene responsiveness in broccoli
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Citation Postharvest Biology and Technology, Volume 52, Issue 2, May 2009, Pages 216-220
Keywords Broccoli; Ethanol; Ethylene responsiveness; Postharvest; Senescence

Abstract

Broccoli (*Brassica oleracea* L. Italica Group) senescences very rapidly at room temperature after harvest. Ethanol vapor treatment with ethanol pads inhibits ethylene production and prolongs the shelf-life of harvested broccoli. The effects of postharvest ethanol vapor treatment on ethylene responsiveness in broccoli were investigated to clarify the mechanism of the inhibition of senescence with ethanol treatment and develop applications for ethanol pads. Broccoli branchlets were packed in a perforated polyethylene bag with or without ethanol pads and were continuously exposed to ethylene or not at 20 °C in darkness. Exogenous ethylene accelerated the yellowing of florets and stimulated ethylene and respiration climacteric patterns. These ethylene responses were inhibited by ethanol vapor treatment. Stimulation of the activities of 1-aminocyclopropane-1-carboxylic acid (ACC) synthase and ACC oxidase and induction of the expression of *BO-ACO1*, *BO-ACO2*, and *BO-ACSI* by exogenous ethylene were suppressed by ethanol vapor treatment. These results show that postharvest ethanol vapor treatment inhibits the senescence of harvested broccoli through the suppression of ethylene responsiveness as well as ethylene biosynthesis.