## Effects of air-exposure time on water relations, longevity, and aquaporin-related gene expression of cut roses

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## Abstract

In this study, we aimed to assess the effects of air-exposure treatment on water relations, longevity, and aquaporin-related gene expression of cut 'Wild Look' roses (Rosa hybrida L.). After harvest, cut rose flowers were placed directly in the tap water (exposed to air for 0 h) or exposed to air for 1, 2, or 3 h and then placed in tap water to recover. We determined the effects of air-exposure time on vase life, water relations, morphological and physiological characteristics, bacterial contamination, and on the expression of aquaporin-related gene of cut flowers. Our results revealed that cut flowers exposed to air for 0 h exhibited a highest postharvest quality. Exposure to air for 3 h significantly decreased the postharvest quality of cut flowers cultivated year-round owing to the early failure of water relations, such as maintaining a positive water balance for a short duration, high transpiration under dark conditions, and bacterial proliferation. Notably, in autumn or winter, exposure to air for 1 and 2 h also decreased vase life of cut roses. Exposure to air for 0 h reduced bacterial population at the basal of cut stem ends, decreased water stress, and maintained leaf chlorophyll fluorescence of cut roses cultivated year-round. Exposure to air for 0 h prevented water stress in cut flowers and increased the transcript levels of Rh-PIP2;1 and Rh-TIP in petals, resulting in maintained cell turgor of petals and improved flower diameter of cut roses. Understanding the relationship between airexposed time and water relations, longevity, and aquaporin-related gene expression of cut roses may help to develop techniques and distribution systems to improve the vase life of cut roses.