Effect of Dry and Wet Harvest on Postharvest Longevity, Water Relations, and Gene Expression of Cut Roses

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Rose (Rosa hybrida L.) is one of the most economically important flowers and has a significant role in the cut flower industry. However, the cut rose flowers often end their postharvest longevity at an early stage of maturity due to water stress under unfavorable postharvest conditions. In this work, after harvest, the cut roses ‘Wild Look’ were immediately placed in tap water or Scutellaria baicalensis Georgi extract (SC) solution (wet harvest; NA-W and NA-SC) or exposed to air for 1, 2, and 3 h and then placed in tap water (A-1-W, A-2-W, and A-3-W) or SC solution (A-1-SC, A-2-SC, and A-3-SC) for recovery. We determined the effect of wet and dry harvest on vase life, water relations, morphological and physiological characteristics, bacterial contamination, and gene expression of cut flowers. Our results revealed that wet harvest treatment exhibited a higher postharvest quality of cut flowers than dry harvest. A-3-W treatment significantly decreased postharvest quality of cut flowers grown year-round due to an early failure of water relations such as larger stomatal size in the dark, higher transpiration, shorter time maintaining positive water balance, and the bacterial proliferation. Especially, A-1-W and A-2-W treatments also decreased the vase life of cut winter roses. NA-SC treatment significantly reduced the bacterial population at the basal of the cut stem ends, maintained leaf chlorophyll fluorescence ratios, decreased water stress and leaf temperatures, improved water relations, and extended the vase life of cut roses year-round. The good water uptake of NA-SC treated flowers may contribute to increasing the expression of Rh-PIP2;1 and Rh-TIP in rose petals, resulting in maintained cell turgor and increased flower diameter of cut flowers. These results recommend that NA-SC is used for harvest stage to improve postharvest quality of cut rose flowers grown year-round. Understanding the relationship between air-exposed time and water relation of cut roses will greatly help to develop techniques and distribution systems for guaranteeing the postharvest longevity of cut rose flowers.

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