

Hydrogen gas increases the vase life of cut rose ‘Movie star’ by regulating bacterial community in the stem ends

Hua Fang, Chunlei Wang, Shuya Wang and Weibiao Liao

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Abstract

Hydrogen gas (H_2), as a signal molecule, is involved in plant growth, development and stress response. However, there are no reports about the effects of H_2 on the bacteria at the stem ends of cut flowers. The study investigated whether hydrogen-rich water (HRW, as a H_2 donor) might regulate the postharvest preservation of cut rose (*Rosa hybrida* ‘Movie star’) by regulating bacteria community of the stem ends. The results showed that HRW significantly improved the vase life of cut rose. HRW inhibited bacterial colonization and biofilm formation in the xylem vessels. Thus, HRW decreased the bacterial blockages and rot in the xylem vessels, thereby promoting water uptake of cut flowers and prolonging their vase life. While, by high-throughput sequencing of the 16S rRNA gene sequence, we found that HRW significantly increased the richness index of bacteria on the stem-end cut surface, suggesting that the beneficial bacteria abundances on the stem-end cut surface were increased by HRW. The results from the individual beneficial bacteria inoculations also verified the results. Consequently, HRW increased the vase life and ornamental quality of cut roses by decreasing bacterial blockages in the xylem vessels and increasing the beneficial bacteria abundances on the stem-end cut surface.