

Expression of *etr1-1* gene in transgenic *Rosa hybrida* L. increased postharvest longevity through reduced ethylene biosynthesis and perception

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Scientia Horticulturae 263: 109103. (2020)

Abstract

The present research aimed to scrutinize the role of *Arabidopsis etr1-1* gene in ethylene sensitivity of two cut roses, namely the *etr1-1* mutated transgenic (TR) and wild type lines of *Rosa hybrida* L. cv. Vendetta. The cut roses were treated either by exogenous $1.2 \mu\text{g L}^{-1}$ ethylene or 80 mg L^{-1} gibberellic acid (GA_3) at commercial bud stage. The postharvest longevity, contents of peroxide and phenolics, ethylene production, and expression of ethylene signal transduction genes (*RhETR1,2,3,4,5* and *RhCTR1,2*) were measured in both treated and control samples of the wild type and TR lines at both bud and half-open stages. The TR rose lines were not fully insensitive to ethylene and only showed less ethylene induced oxidative stress and flower senescence. The GA_3 -treated TR lines showed the highest vase life (22 d) mainly because of increasing the contents of total phenols and decreasing the ethylene synthesis. The cut roses showed a significant expression of *RhETR2,4,5* genes upon GA_3 treatment and the expression of *RhETR1,3* and *RhCTR1,2* genes upon ethylene exposure. The *etr1-1* mutation of the rose decreased both endogenous ethylene biosynthesis and perception.