

Abstract:

Rose gene fragments encoding products with similarity to the Arabidopsis ETR1 ethylene receptor (RhETR1-4 GenBank Acc. no. AF127221, AF127220, AF154119, AF159172), two CTR-gene homologues (RhCTR1 AF 271206, RhCTR2 AY029067) and a transcription factor homologue RhEIN3 (AY052825) were isolated and characterized. Ethylene receptor genes were regulated during flower senescence and in response to ethylene, and transcript levels differed clearly between the two genotypes. The results indicate that differences in flower life among rose cultivars, which have been presented in earlier physiological studies, may be due to differences in receptor levels. Furthermore, expression of two homologues of CTR - acting downstream of the ethylene receptors in the signal transduction pathway - was investigated. RhCTR1 expression increased during flower senescence in the two rose cultivars with differences in ethylene sensitivity and flower longevity, while RhCTR2 was constitutively expressed during flower development. Additionally, the expression of both RhCTR1 and RhCTR2 increased in response to exogenous ethylene. The differential expression of the CTR-homologues indicated an impact of these genes on postharvest performance of miniature roses. The transcription factor RhEIN3 (83% identity to AtEIN3), which is a positive regulator of the ethylene response and acts downstream to CTR, is constitutively expressed during flower senescence and in response to ethylene. These findings are related to the current model of ethylene signal transduction.