

Title Expression analysis of genes for ethylene biosynthesis enzyme, ethylene perception and signal transduction pathway after pretreatment with ethylene receptor inhibitors of miniature potted roses (*Rosa hybrida* L.)

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Abstract

In order to investigate transcript abundance of genes for ethylene biosynthesis enzyme (*RhACSI-5*), ethylene perception (*RhETR1-4*) and signal transduction pathway (*RhCTR1-2*, *RhEIN3*, *RhEIL*), expression of these transcripts in petal tissues was examined in two rose cultivars ‘Vanilla’ and ‘Lavender’ during continuous exposure to exogenous ethylene and ethylene-free air after pretreatment with inhibitors of ethylene receptors, 1-MCP, 1-OCP and 1-DCP. Additionally, one of the ethylene-responsive element-binding factor (*ERFs*) genes was isolated from miniature potted roses (*RhERF1*) which was 92 bp long, encoding a predicted polypeptide for an Ap2 DNA binding domain and sharing high homology with other reported ERF domains. Northern blot hybridization analysis was used to compare with results of RT-PCR. However, it was difficult to distinguish the hybridization signal of ethylene receptors between *RhETR1* and *RhETR2*, which were highly homologue. RT-PCR analysis revealed that ethylene induced the expression of all genes investigated in control ‘Vanilla’ and ‘Lavender’ petals except *RhACSI-2* and *RhETR4*, respectively, while pretreatments of 1-MCP and 1-OCP led to the suppression of all investigated mRNAs in the presence or absence of ethylene. However, strong expression of *RhETR3*, *RhEIN3* and *RhEIL* transcripts was detectable in ‘Lavender’ petals pretreated with 1-DCP.