# Ethylene biosynthesis and signal transduction are enhanced during accelerated ripening of postharvest tomato treated with exogenous methyl jasmonate

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## Abstract

Phytohormone methyl jasmonate (MeJA) plays an important role in fruit ripening. This research aimed to investigate the regulation of MeJA in ethylene biosynthesis and signal transduction during postharvest tomatoes ripening. After mature green cherry tomatoes were infiltrated with MeJA (0.5 mM) or deionized water (control) respectively, fruit colour and firmness, ethylene production, the activities and expressions of ACS and ACO, as well as the expressions of major genes involved in ethylene signal transduction were periodically monitored. Results showed that a significant acceleration in ripening in MeJA-treated fruit was observed, along with the accelerated changes of ethylene production, the enhanced activities and expression levels of ACS and ACO. The expression levels of *ETR3*, *ETR4*, *ETR6*, *ETR7*, *EIN2*, *EIL2*, *EIL3*, *EIL4* and *ERF1* were up-regulated (from 1.26- to 6.50-fold) by MeJA during tomatoes ripening. The expression of *CTR1*, however, was down-regulated (from 0.23- to 0.54-fold). Moreover, the expression of *EIL1* was positively regulated at the early ripening stage whereas negatively regulated at the late ripening stage (11.76-/0.39-fold), whereas the expressions of *CTR3* and *CTR4* showed the opposite expression patterns (0.15-/7.78-fold, 0.48-/2.00-fold). Results suggested the up-regulation of the genes associated with ethylene biosynthesis, as well as the up-regulated transcriptional levels of the most genes involved in ethylene signal transduction, leading to the increase of ethylene production, response and action, would be one of the major mechanisms of MeJA in accelerating postharvest tomatoes ripening.