The methyl jasmonate accelerates the strawberry fruits ripening process

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Abstract

In this study we analyzed changes in jasmonic acid (JA) content during the development of the octoploid strawberry cultivar (*Fragaria* × *ananassa* Duch. "Benihoppe"). Here, strawberry fruits were treated with different concentrations of methyl jasmonic acid (MeJA, 50 μM, 100μM, 230 μM, 400 μM), respectively, to identify the optimal concentration of MeJA in promotion fruit maturation. We also examined the expression of genes linked to fruit ripening, as well as physiological changes that occurred after MeJA treatment. Using transient gene expression analyses, we performed that key genes in the jasmonic acid biosynthesis pathway, including *FaAOC* and *FaAOS*, were overexpressed in fruit, and we further studied their effects on fruit maturation. The results showed that endogenous JA content in the strawberry fruit increased sharply from the small fruit stage to the white fruit stage, but declined after the fruit had ripened, reaching a minimum when fully ripened. MeJA treatment can promote the development and maturation of strawberry fruit, and we found that the optimal concentration to promote maturation was 230 μM. MeJA treatment was associated with increased expression of genes involved in pigment metabolism, sugar metabolism, fruit softening, and hormone metabolism, as well as increases in JA, anthocyanin, and sugar content. Moreover, MeJA treatment was associated with decreased fruit hardness. Overexpression of *FaAOC* and *FaAOS* were also found to accelerate strawberry fruit maturation.