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The *MdMADS14* and *MdMADS16* gene play an important role in fruit and seed development by regulating synthesis of active gibberellins

Young-Pyo Lee[1], Yeon Ok Choi[1], Chae-Wan Lim[1], Gyung-Hee Yu[2], Jeong Hee Kim[3], Soon-Kee Sung[1*]

[1]Biotechnology Research Division, Dongbu Advanced Research Institute, Daejeon 305-708, Korea; [2]Biotechnology and Environment Standards Division, Agency for Technology and Standards, Ministry of Commerce, Industry and Energy, Gwacheon, Gyonggi-do 427-716, Korea; [3]National Horticultural Research Institute, 131 I-mok Dong, Suwon, 440-706, Korea (*soonkee@dongbuchem.com)

Two MADS-box genes, *MdMADS14* and *MdMADS16*, were isolated from apple (*Malus* x *domestica* Borkh.) variety Fuji. The *MdMADS14* and *MdMADS16* share a high degree of amino acid sequence identity with the *AGAMOUS* subfamily genes. The deduced amino acid sequences of these genes were 242 aa and showed 88.4% identity when compared each other. To understand the function of *MdMADS14* and *MdMADS16* in the fruit development, we produced transgenic tomatoes which have sense and antisense RNA expression of the *MdMADS14* or *MdMADS16* controlled by the CaMV 35S promoter. Transgenic tomatoes in which *MdMADS14* or *MdMADS16* gene were over-expressed resulted in a distinct phenotypes. Transgenic tomatoes over-expressed *MdMADS14* (or *MdMADS16*) showed a delay in fruit ripening and an acceleration in seed germination. They also showed a production of parthenocarpic fruits with sepals developing into fruit flesh. Anti-sense transformants in which expressions of *MdMADS14* or *MdMADS16* were suppressed seed development, as results showed a phenotype of the absence of fruits. We examined the expression level of a gene coding for *LeGA20ox-1* (tomato GA20-oxidase), which has been known as a negative feedback regulated gene by active gibberellins, in the transformants over-expressed *MdMADS14* or *MdMADS16*. The level of *LeGA20ox-1* expression in these transformants was much lower than that in the wild type. Whereas the *LeGA20ox-1* expression level in the anti-sense transformants of *MdMADS14* or *MdMADS16* was much higher than that of the wild type. These results suggest that *MdMADS14* and *MdMADS16* gene have the important function in fruit and seed development by regulating active gibberellin synthesis.

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