

Title Gene expression of pathogenesis-related protein during banana ripening and after treatment with 1-MCP

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Abstract

Pathogenesis-related (PR) proteins are generally considered as plant defense proteins associated with preventing or limiting pathogen and insect attack. Identification and characterization of a fruit PR1, the *MaPR1a* gene, is reported here for the first time from banana. The *MaPR1a* cDNA is 606 bp long and contains an open reading frame of 489 nucleotides encoding 162 amino acid residues. The deduced amino acid sequence of *MaPR1a* has a high level of identity with PR1 proteins from other plants. Southern blot as well as nucleotide sequence analyses using the Global Musa Genomics Consortium database suggests that *MaPR1a* is encoded by a multigene family in banana. Ethylene exposure of unripe mature banana fruit induced *MaPR1a* expression, which increased with ripening, and 1-methylcyclopropene (1-MCP) treatment prior to ethylene exposure inhibited expression. No expression was detected in any other tissue which suggests that *MaPR1a* gene family members are fruit-specific and ripening related. The 1506 bp proximal promoter of the gene shows the presence of *cis*-acting elements which could bind to sets of transcription factors as well as regulate jasmonic acid (JA) and salicylic acid (SA) signalling. Our expression analysis suggests that in addition to ethylene, JA and SA also induce expression of *MaPR1a* in fruit tissue.