

**Title** Multiple forms of  $\alpha$ -expansin genes are expressed during banana fruit ripening and development

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#### **Abstract**

Fruit ripening and softening involve depolymerization of complex cell wall components. The complexity of fruit softening through involvement of several cell wall modifying genes has been well documented. More than one class of enzymes and proteins are involved in the process of softening and these may either act sequentially or synergistically. In this paper we provide further evidence of the complexity of fruit softening by demonstrating the simultaneous expression of multiple genes of the *same* family during softening. We report the identification of four  $\alpha$ -expansin genes, *MaEXPA2*, *MaEXPA3*, *MaEXPA4* and *MaEXPA5* from banana fruit which express differentially during fruit development and ripening. The ORFs range from 750 to 774 bp in size. All four genes also possess two introns with variable sizes ranging from 75 to 343 nucleotides that are conserved in position. All the four genes were expressed during the course of ripening. Of these, *MaEXPA2* was fruit specific and showed a strong ripening related and ethylene dependent expression in banana fruit. *MaEXPA4* expressed both during fruit growth as well as ripening and might be related to expansion. *MaEXPA3* and *MaEXPA5* were also expressed in tissues other than fruit. It is concluded that expression of multiple expansin genes might be required for softening not only in dicot fruit such as pear, apple and strawberry but also in monocot fruit such as banana.