

Title 1-MCP delayed softening and affected expression of *XET* and *EXP* genes in harvested cherimoya fruit

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Abstract

Cherimoya, a typical climacteric fruit, is very susceptible to postharvest losses, due to rapid softening. It has been reported that xyloglucan endotransglycosylases (*XET*) and expansins (*EXP*) contribute to fruit softening while 1-methylcyclopropene (1-MCP) is used to delay softening in many fruit. However, the effects of 1-MCP on cherimoya fruit softening and in relation to the expression of *XET* and *EXP* genes remain unclear. In this study, three different full length *XET* cDNAs, termed *AcXET1*, *AcXET2* and *AcXET3*, were isolated and characterized. Delay in cherimoya fruit softening by 1-MCP in relation to the expression of *XET* and *EXP* genes was investigated. Cherimoya fruit stored at 20 °C softened rapidly within 5 d and displayed a typical climacteric pattern of ethylene production. Application of 1-MCP greatly delayed and inhibited ethylene production and softening of fruit during storage at 20 °C. Northern blot analysis showed that three *AcXETs* or *AcEXPs* exhibited different expression patterns during fruit softening while mRNAs of *AcXET2*, *AcEXP1* and *AcEXP3* significantly accumulated on day 3 and mRNAs of *AcXET1* or *AcEXP2* accumulated on day 5 or day 6. 1-MCP treatment not only delayed the accumulation of *AcXET1*, *AcEXP1* and *AcEXP3* for 1, 3 and 2 d, respectively, but also reduced the mRNA levels of *AcXET1*, *AcXET2*, *AcXET3*, *AcEXP1*, *AcEXP2* and *AcEXP3*. These data suggest that differential expression of *AcXETs* and *AcEXPs* is associated with fruit softening of cherimoya and application of 1-MCP retarded or suppressed the expression of *AcXETs* or *AcEXPs*, which may be attributed at least or partially to 1-MCP delayed fruit softening.