

Title Effect of adenosine triphosphate on changes of fatty acids in harvested litchi fruit infected by *Peronophythora litchii*

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Abstract

Recent investigations have shown that disease development of harvested horticultural crops may be attributed to a limited availability of energy or low energy production. In this study, litchi fruit were treated with 1.0 mM adenosine triphosphate (ATP) or 0.5 mM 2,4-dinitrophenol (DNP) and then half of the ATP-treated fruit were inoculated with *Peronophythora litchii*. The composition and contents of fatty acids (FAs) and esterase activity in litchi fruit during storage were investigated. Free fatty acids (FFAs) in all fruit increased over storage, especially in the *P. litchii*-inoculated fruit. In particular, the content of saturated FAs increased faster than unsaturated FAs. In polar lipids (PL), a decrease in the amount of C18:3 and an increase in the amount of C16:0 or C18:0 was found during storage, while the proportions of C16:0, C18:0 and C18:1 in neutral lipid (NL) gradually increased but the proportions of C18:3 decreased during storage. The proportion of C18:2 increased within the first four days and then decreased. Exogenous ATP treatment suppressed the release of FFAs and increased the contents of each FA in PL, indicating a slower hydrolysis of lipids. ATP treatment also delayed the increase in the proportion of C18:0 in NL. Further analysis showed that the double bond index (DBI) of litchi fruit decreased in all fractions of FAs and ATP treatment can slow the decrease in DBI. In addition, lower esterase enzyme activity was detected in all ATP-treated fruit. Treatment with DNP (a respiration uncoupler) increased esterase activity. *P. litchii*-inoculated fruit after ATP treatment also exhibited similar trends in delaying the release of FFAs. Enhanced disease resistance of litchi fruit by ATP could involve the levels of FAs and esterase activity.