

**Title** ATP-regulation of antioxidant properties and phenolics in litchi fruit during browning and pathogen infection process

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### **Abstract**

The impact of energy level on antioxidant properties in relation to pericarp browning and loss of disease resistance of litchi fruit was investigated. Litchi fruits were vacuum-infiltrated with distilled water (control), 1 mM adenosine triphosphate (ATP) and 0.5 mM 2,4-dinitrophenol (DNP) under 75 kPa for 3 min before being inoculated with *Peronophythora litchi* or not. ATP-treated fruits presented higher activities of antioxidant enzymes, including catalase (CAT), superoxide dismutase (SOD) and ascorbate peroxidase (APX). Higher activities of 1,1-diphenyl-2-picrylhydrazyl (DPPH) scavenging, reducing power and contents of phenolic compounds were also observed in ATP-treated fruit during storage. In contrast, DNP treatment lowered the enzymes activities, scavenging ability and the contents of phenolic compounds. Higher levels of antioxidant enzymatic system and non-enzymatic system were observed in *P. litchii*-inoculated fruits than those in non-inoculated fruits. Application of ATP and DNP exhibited a similar change patterns and effects in inoculated fruits. When related to previously reported ATP levels, the results suggested that ATP levels could regulate the antioxidant system. Sufficient available energy is crucial for inhibiting browning and preventing the loss of disease resistance in harvested litchi fruit.