

**Title** Fruit quality and physiological responses of litchi cultivar McLean's Red to 1-methylcyclopropene pre-treatment and controlled atmosphere storage conditions

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### **Abstract**

The effect of 1-MCP pre-treatment and two different controlled atmosphere storage conditions (CA-1, 17% O<sub>2</sub> + 6% CO<sub>2</sub>; CA-2, 7% O<sub>2</sub> + 3% CO<sub>2</sub>) on fruit quality parameters and physiological changes with respect to pericarp browning in 'McLean's Red' litchi were investigated. Fruits were pre-treated with 1-MCP (500 n/l) and held at CA-1 or CA-2 for 21 d at 2 °C and at 90% RH. Stand-alone CA-1 or stand-alone CA-2 and the commercially adopted sulphur dioxide (SO<sub>2</sub>) treatment were included in this study for comparison. Of the five treatments 1-MCP + CA-1 was most effective in preventing browning, loss of red colour (colour value *a*\*) of the pericarp, ascorbic acid content; and retaining acceptable SSC/TA and taste. Fruit from 1-MCP + CA-1 showed higher overall acceptance after 21 d storage without any off-flavour according to the sensory panel data. 1-MCP + CA-1 reduced the polyphenol oxidase (PPO) and peroxidase (POD) activity, retained membrane integrity and anthocyanin content during storage. Although SO<sub>2</sub> treatment prevents browning it showed negative effects on SSC/TA, taste and membrane integrity. Stand-alone CA-2 condition indicated higher pericarp browning, PPO, POD activity and loss of membrane integrity. Therefore, 1-MCP pre-treatment and CA-1 retains overall fruit quality for up to 21 d.