

**Title** A preliminary study on the effect of metabolic stress disinfection and disinfestation (MSDD) on ripening physiology and quality of kiwifruit and apple

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### **Abstract**

Metabolic stress disinfection and disinfestation (MSDD) is a relatively new quarantine treatment in which fruit are exposed to rapid decompression and compression cycles and high CO<sub>2</sub> atmosphere, followed by exposure to ethanol vapour under decompression. This study evaluated the ripening response of ‘Hayward’ kiwifruit (*Actinidia deliciosa*) and ‘Pink Lady’ apple (*Malus x domestica*) to MSDD treatment, which can control longtailed mealybug (*Pseudococcus longispinus*). Following the treatments, fruit were held at 20 °C for 7 d for shelf-life assessment, while the remainder were refrigerated at 0.5 °C for 16 weeks. Respiration rate, volatile (ethylene, ethanol and acetaldehyde) production rates, firmness and disorders were measured at regular time intervals. MSDD treatments did not affect the metabolic activities and quality of ‘Pink Lady’ apples. However, firmness was reduced by 4.9 N in non-refrigerated MSDD treated fruit. MSDD treatments did not control superficial scald disorder in refrigerated ‘Pink Lady’ apples. For ‘Hayward’ kiwifruit, treatments increased the respiration rate and ethylene production of short-term refrigerated fruit, promoted endogenous production of ethanol and acetaldehyde in both short-term and long-term refrigerated fruit. MSDD treatments also increased the incidence of rots in refrigerated ‘Hayward’ kiwifruit. MSDD treatments accelerated the softening of short-term refrigerated kiwifruit, but retarded the softening of ‘Hayward’ kiwifruit during the 16 weeks of refrigerated storage. MSDD could potentially be used as a quarantine treatment of apples. Further studies are required on the sensory effect of MSDD treatment.