Title Physiological and biochemical responses of horticultural products to methyl jasmonate

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Citation Stewart Postharvest Review, Volume 2, Number 1, February 2006, pp. 1-9(9)

Keyword methyl jasmonate; chilling injury; ethylene; ripening; senescence; stress-related enzymes

Abstract

Purpose of review: This article reviews the effects of methyl jasmonate (MJ) on the postharvest quality of horticultural crops and the prospective design of a MJ-based commercial treatment.

Recent findings: The increasing demand for consumption of fresh horticultural crops, along with more restrictions on the use of synthetic chemicals to preserve produce quality, has encouraged scientific research to aim at developing new technologies based on natural products such as MJ and its derivatives. MJ treatment regulates diverse processes such as skin colour development (by promoting β-carotene synthesis and chlorophyll degradation), chilling injury and ion leakage. Treatment with MJ reduces a number of stress-induced injuries that occur during the postharvest life of intact and fresh-cut fruits and vegetables. Studies show that fruits treated with MJ maintain higher sugar, organic acid and vitamin C levels. MJ has also been shown to stimulate ethylene production, by increasing 1-aminocyclopropane-1-carboxylatic acid (ACC) synthase and ACC oxidase activities, which in turn enhances fruit ripening. Furthermore, MJ treatment inhibits the gray mould rot caused by *Botrytis cinerea* and reduces decay caused by the green mould *Penicillium digitatum*. Recently, it was reported that MJ induced the expression of pathogenesis-related protein and alternative oxidase genes, increased the transcript accumulation of heat shock proteins, and enhanced antioxidant capacities and antioxidant enzyme activities. These findings help to explain the mode of action of MJ in increasing chilling tolerance in fruits and vegetables.

Direction for future research: The challenge for future research will be to develop treatments with optimal application and conditions for each crop; this will help to maintain quality and prevent deterioration of perishable crops for a period of time that is long enough to allow the commercialisation of produce in distant markets. In this regard, the use of MJ in combination with packaging is a good alternative treatment, and has the potential to be used as a commercial treatment in the near future.