

Title Reducing chilling injury and maintaining quality of horticultural crops with natural products and their derivatives

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Abstract

Most tropical and subtropical crops are susceptible to chilling injury. They can not take the advantage of refrigeration to lengthen their storage and shelf lives because of the development of chilling injury symptoms when exposed to low temperatures. Therefore, how to reduce chilling injury and maintain quality of these crops after harvest becomes an important task. We have found that certain natural products and their derivatives seem to be effective in delaying the onset and reducing the severity of chilling injury symptoms. Of many natural products that we have tested, methyl jasmonate (MJ) and methyl salicylate (MS) were the most beneficial. These two natural volatile compounds consistently reduced chilling injury in mangoes, papayas, peppers, tomatoes, and zucchini squashes. MJ and MS were also found to enhance the resistance of tissues to chilling injury by increasing the gene expression of heat shock proteins, pathogenesis-related proteins, and alternative oxidase. Recent results also showed that MJ increased antioxidant capacities, antioxidant enzyme activities, and free radical scavenging capacities in the tissues. These results indicate that MJ can act to prevent chilling injury by a mechanism which involves protecting tissues from free radical injury.