

Pre-harvest hexanal spray reduces bitter pit and enhances post-harvest quality in ‘Honeycrisp’ apples (*Malus domestica* Borkh.)

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Abstract

‘Honeycrisp’ is a popular apple variety among consumers due to its desirable flavour and characteristic texture. However, this variety is highly prone to pre-harvest fruit drop, bitter pit and decline in quality during long-term storage. This research investigated the effects of hexanal as a formulation (named by us as Enhanced Freshness Formulation -EFF) on fruit retention and post-harvest shelf-life in ‘Honeycrisp’ apples. Hexanal is a known inhibitor of phospholipase D (PLD). Our results indicated that hexanal application reduced PLD enzyme activity from 30 days post-harvest to the end of the storage period compared to the other treatments. Ethylene production was reduced with hexanal treatment from 0 to 90 days post-harvest. An increase in total soluble solids and a decrease in physiological loss in weight was observed with hexanal application. A significantly lower occurrence of progression and severity of bitter pit was observed, while incidence of bitter was reduced by 70 %. Further electron micrographs revealed that hexanal treated apples had higher structural integrity overall. Our results reveal that application of hexanal can reduce bitter pit incidence in Honeycrisp apples, while increasing the post-harvest storage.