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Cytokinin, jasmonates and postharvest physiology  
of *Asparagus officinalis* L.

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## Abstract

The asparagus spear is a rapidly growing shoot, dependent on the crown and storage roots for substrate. Once harvested, spears have a very short shelf-life. Investigations to date point to a physiological cause of this deterioration rather than a pathogenic one. Since loss of membrane integrity is a notable feature of the postharvest deterioration, spears were treated immediately following harvest with cytokinin (which promotes membrane integrity), and jasmonic acid (produced by deteriorating membranes). Treated plant material was collected and monitored for physiological and compositional changes. Results show a reduction in postharvest elongation of spears treated with cytokinin, and a reduction of shelf-life of spears treated with jasmonic acid, when compared with control spears treated with water. Also an extension of shelf-life was observed for spears treated with cytokinin. We quantified jasmonates using ELISA in spears after harvest, and also in naturally senescing cladophylls. Jasmonate concentration increased in spears rapidly after harvest, which is most likely to be in response to wounding. Results also showed that jasmonates may be involved in desiccation stress and cessation of elongation in asparagus spears. Jasmonate production and metabolism appears to be more ordered during natural foliar senescence than during harvest induced senescence of the spear. Jasmonic acid and dihydrojasmonic acid are metabolised to cucurbitic acid during the later stages of natural foliar senescence. The presence of jasmonates in asparagus spears was confirmed by electrospray ionisation mass spectrometry. This analysis also enabled to identify a novel jasmonate, tryptophan-dihydrojasmonic acid amino acid conjugate.

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