

Valeric acid suppresses cell wall polysaccharides disassembly to maintain fruit firmness of harvested 'Waizuli' plum (*Prunus salicina* Lindl)

Mingyang He, Yanfei Wu, Yong Wang, Min Hong, Taotao Li, Tujing Deng and Yueming Jiang

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Abstract

Cell wall polysaccharides are closely related to fruit firmness. Firmness loss results in softening and restricts postharvest storage of plum fruit at ambient temperature. This study aimed to investigate the effects of valeric acid (VA) treatment on fruit firmness and cell wall polysaccharides metabolism in plum fruit. Results showed that 10 mg L⁻¹ VA treatment delayed the decline of plum fruit firmness. VA-treated plum maintained higher contents of protopectin, cellulose, hemicelluloses, and lignin but lower water-soluble pectin (WSP) amount. Lower activities of polygalacturonase (PG), pectinate lyases (PL), pectinesterase (PE), β -galactosidase (β -GAL), cellulase, hemicellulase but higher activities of phenylalanine ammonia lyase (PAL), 4-coumaroyl-CoA ligase (4CL) and peroxidase (POD) were observed in VA-treated fruit. These results suggested that VA treatment delayed the depolymerization of cell wall polysaccharides via inhibiting activities of degrading-enzymes. Moreover, lignin metabolism was regulated by VA treatment. Altogether, VA treatment regulated cell wall polysaccharides metabolism, then subsequently alleviated firmness loss and prolong storage-life of postharvest plum fruit.