

Involvement of pectin and hemicellulose depolymerization in cut gerbera flower stem bending during vase life

Guiping Cheng, Ling Wang, Shenggen He, Jiping Liu and Hua Huang

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Abstract

This study was designed to evaluate the modifications of pectin and hemicellulose polysaccharides, as well as their putative effects, during the stem bending of fresh-cut gerbera flowers. Flowers bend in the region 6–12 cm below the capitulum starting after 6 days, and have an average vase life of approximately 9 days. The cell wall structure of the vascular bundles disintegrates with the occurrence of stem bending. The bending of the stem corresponded to an increase in water-soluble pectin (WSP), and gradual decreases in acid-soluble pectin (ASP), 1 M KOH-soluble hemicellulose (HC1), and 4 M KOH-soluble hemicellulose (HC2). The predominant monosaccharide components were galactose, rhamnose, and arabinose for the WSP and ASP fractions, and glucose and xylose for the HC1 and HC2 fractions. The molecular mass decreased for the WSP and increased for the ASP fraction, whereas the HC1 fraction showed a strong increase on day 6 and then decreased on day 11. Enzyme activity analysis showed that the activities of polygalacturonase and cellulase decreased gradually, and pectin methylesterase first increased and subsequently decreased. These results provide further evidence that the depolymerization of pectin and hemicellulose may affect stem bending in cut flowers. Our findings help our understanding of the physiological and biochemical modifications in the regulation of the mechanical strength of the cell walls of cut flowers during vase life.