

Title The dynamics of starch and sugar utilisation in cut peony (*Paeonia lactiflora* Pall.) stems during storage and vase life

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Abstract

The carbohydrate dynamics of cut peony (*Paeonia lactiflora* Pall. 'Sarah Bernhardt') stems were examined during vase life of fresh-cut stems, while in storage at 0 °C and during their vase life after storage. During flower opening of fresh-cut stems, the rate of starch hydrolysis in the flower buds was more rapid than in those still attached to the plant, and once the flowers had opened, the total sugar concentrations of the flowers, leaves and stems were lower than in those still attached to the plant. Quantification of the sugar content of fresh-cut stems during flower opening and those still attached to the plant, suggests that an additional 3.2 g of sugars are translocated into attached stems during flower opening, which equates to nearly 42% of an open flower. However, reserves in fresh stems were still sufficient to provide a total vase life of 14 d, only 2 d less than stems still attached to the plant. During the first 4 weeks of cool-storage, starch reserves in the flower buds were almost completely hydrolysed, contributing to similar hexose concentrations but much higher sucrose concentrations than in fresh-cut stems. Flower opening was more rapid but the subsequent vase life was only 9 d, shorter than that for fresh-cut stems. Much of that difference could be attributed to the faster opening of buds (2 d cf. 5 d), which is likely to have been the result of the starch having already been hydrolysed during storage. Together, these results indicate that cut peony stems have sufficient carbohydrate reserves to drive flower opening and still have an acceptable vase life even after 8 weeks of storage.