

Title The role of invertase in rose flowers in postharvest conditions
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Abstract

Cell expansion caused by water influx in petal cells is an important mechanism responsible for the flower opening process. It is believed that carbohydrates are key factors as an osmolyte to draw water into cells. To clarify the mechanism of flower opening and to improve cut flower quality, we investigated sucrose metabolism in rose petals using attached and cut flowers. In this study, rose cut flowers harvested at stage (ST) I (just before the commercial harvesting stage) with a 10-cm peduncle were used. Stems treated with water were used as the control, and others were treated with 90 mM sucrose. Control flowers did not open, but sucrose-treated flowers opened fully. However, the petal fresh weight of sucrose-treated flowers at ST III (outer petals were expanded and started to reflex) was lower than that of attached ones. Although the sucrose level in sucrose-treated flowers was at a comparable level, the hexose levels were lower than that of attached ones. Invertase activity in attached flowers increased markedly during petal growth, but it decreased in cut flowers, even when detached flowers were treated with sucrose. We have investigated fresh weight, sugar concentration and invertase activity of cut flowers with 30-cm long stems. All values were higher than those of the flowers cut to a 10-cm length, but lower than those of attached ones. These results suggest that invertase activity induced by substances produced in the stems and/or leaves could be an important factor for flower opening. We are now investigating the induction mechanisms of invertase in postharvest conditions to improve cut flower quality.