

Abstract

The postharvest physiology of red ginger inflorescence, including the impact of heat treatment to extend inflorescence vase life, was determined. More than 90% of the inflorescences showed inflorescence wilting or bract browning symptoms or both during senescence. Ethylene and the total count microorganisms in the stem segments and the vase solution had no effect on the development of senescence symptoms. I hypothesized that water balance of the cut stem was associated with inflorescence wilting, whereas sugar content was associated with bract browning symptom. While a relationship between inflorescence wilting and water balance was not confirmed, a positive relationship was established between sugar content and inflorescence vase life as the higher the sugar content in cut stem, the longer the inflorescence vase life.

Immersion of the inflorescences in hot water at 40°C for 15 min is recommended as a preconditioning treatment to prevent heat damage to red ginger from the hot water treatment at 50°C for 12 min for insect disinfestation. This combination treatment extends vase life. Extension of inflorescence vase life by the hot water treatment varied with season of harvest and flower variety. Exposure time shorter than 12 min at 50°C was recommended in winter, as the inflorescences had lower thermotolerance than in the summer.

Hot water treated inflorescences exhibited a lower rate of respiration than untreated inflorescence, while ethylene production as a result of the treatment was not significantly detected. Inflorescences treated with hot water maintained a higher sugar levels for a longer period than untreated inflorescences, and this could explain the vase life extension. Hot water treatment also suppressed negative geotropism in the red ginger inflorescences during horizontal storage. The negative geotropic response was delayed for up to 7 days after the hot water treatment.

The sugar content (98%) in the red ginger stem was located in symplast, whereas two percent was attributed to apoplast that is heat resistant as the contents were not affected by the hot water treatment. Sugar metabolism in red ginger inflorescence may be heat sensitive. However, the activity of sugar metabolic enzymes: sucrose phosphate synthase, sucrose synthase and invertase, were not directly related to the changes in sugar content after hot water treatment. It is, therefore, suggested that factors other than the activity of these enzymes affect sugar content of the cut stem.