ABSTRACT

Various postharvest treatments (cold storage, stem-end treatments and vase-water additives) were evaluated for the effect on:

1. Longevity and quality of freshly cut *Gloriosa superba* L., *Kniphofia uvaria* (L.) Oken 'Flamenco', *Tulipa gesneriana* L. 'Apeldoorn' in Austria.
2. Long-distance transport of flowers like *Anthurium andraeanum* L. 'Tropical', and foliage like *Codiaeum variegatum* (L.) Blume. 'Excellent', *Cordyline terminalis* (L.) Kunth 'Mike silver' from Sri Lanka to various European countries.

Preparation of vase solutions was made according to the instructions given in the label of the commercial products and published recommendations using deionised water. Chlorophyll fluorescence of randomly selected leaves of cut flower stems was measured with a portable chlorophyll fluorometer (MINI PAM, Walz, Effeltricht, Germany). A chroma meter (Minolta, Model CR-200b; Minolta, GmbH Ahrensburg, Germany) was used to measure leaf and petal colour. A Vapour Pressure Osmometer (Wescor, Inc., Utah, USA) was used to measure leaf and petal osmotic potential at the end of vase life. Soluble solids of defrosted juice of samples were estimated by the refractive index (°brix).

The vase life of *Gloriosa superba* flowers was significantly affected by storage temperature. There was a significant difference between 'dry' and 'wet' storage with standard vase solution for flower quality during vase period. Results highlight that to store cut *Gloriosa* flower stems under wet storage with a selected floral preservative solution or keeping at least wrapped in wet newspapers at 4 °C for less than 7 days helps to increase longevity. *Kniphofia uvaria stems* 'wrapped with wet newspapers' stored at 4 °C showed better postharvest performances than 'dry' stored stems. In the case of cold storage of *Kniphofia*, flower stems wrapped with wet newspapers showed the best option for reducing geotropic bending in storage period and maintaining flower quality in vase period.

Stem-end treatments, *e.g.* heat treatment (60 °C, 15 s) and ultrasonic treatment (1 min) showed a significant prolonging of the vase life of *Anthurium andraeanum* compared to the non-treated control. However, the difference between heat and ultrasonic stem-end

treatments for vase life was non-significant. *Tulipa gesneriana* showed no significant differences for vase-water additives such as Flora 2000, Chrysal clear, Standard vase solution and Flower fresh in increasing fresh weight and vase life. For *Kniphofia uvaria* and *Cordyline terminalis*, stems treated with Flora 2000 or Flower fresh produced the longest vase life, similarly *Codiaeum variegatum* stems placed in 8-HQS produced the longest vase life. Results indicate the difficulties of introducing a standard vase-water additive that can be applied for several cut flowers/foliage species. Results of experiments debate the efficacy of introduced international vase solution to be used as a cut flower/foliage preservative solution for delaying flower senescence, prolonging vase life and enhancing postharvest quality of tested species.

Addition of floral preservatives for *Anthurium* gives results that are statistically indistinguishable from tap water treated flowers, and suggest that there is a little to be gained in adding nutrients during vase life. It proved that nutrients gained in the preharvest stage were the ones that are critical in the postharvest stage. Results indicate that use of tap water as a vase solution for field grown cut flowers was as effective as using floral preservatives. It is necessary to use an appropriate vase solution to maintain flower/foliage colour after long-distance shipment. Water uptake during vase period is highly affected by long-distance transportation, resulting negative water accumulation and substantial fresh weight reduction even at the initial stage of the vase life.

Postharvest changes in chroma and hue angle corresponded with changes in fluorescence components (F_o, F_m, F_v and yield) linked to foliage appearance of 'Excellent' *Codiaeum* and 'Mike silver' *Cordyline*. The data suggest that colour and chlorophyll fluorescence yield may be used as rapid, non-destructive and reliable parameters for monitoring quality during the postharvest chain of cut flowers and cut foliage.