

Is proline the quintessential sentinel of plants? A case study of postharvest flower senescence in *Dianthus chinensis* L.

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Abstract

The present investigation primarily focussed on evaluating the efficacy of exogenous proline on the flower longevity of *Dianthus chinensis* L. Floral buds were harvested at the paint brush stage (i.e., a day prior to anthesis) and divided into 6 sets, with one set of buds (i.e., control) held in distilled water and rest of the 5 sets were supplemented with various concentrations of proline, viz., 10 mM, 20 mM, 30 mM, 40 mM and 50 mM. The application of proline at 40 mM concentration proved out to be most effective in improving the longevity of the flowers by about 4 days as compared to the control. The ameliorated longevity coincided with enhanced floral diameter, fresh mass, dry mass and water content. The flowers with delayed senescence also maintained higher soluble proteins, sugars and phenols. The results suggest that exogenous proline effectively alleviates oxidative stress in the petal tissue, as evident by a relatively lower malondialdehyde content, which is manifested in the form of reduced lipid peroxidation (LPO). Reduced LPO was commensurate with increased membrane stability, quantified by membrane stability index. Moreover, the flowers with improved longevity exhibited a decline in lipoxygenase activity and significant augmentation of antioxidant enzymes superoxide dismutase, catalase and ascorbate peroxidase.