

## Abstract

Gerbera (*Gerbera Jamesonii* L.) is presently a major cut flower crop in the world. Decreasing gerbera quality is a major problem especially in winter and in appropriate greenhouse conditions. Greenhouse growers typically use high nutrient concentrations in attempt to maximize crop yield and quality especially to decrease bent neck incidence but there are environmental concerns associated with increased fertilizer application with continuous growth of the horticultural industry. The use of humic substances (HS) as a promising natural resource could increase, or at least maintain, production quality of ornamental plants with reduced fertilizer inputs. Humic substances (HS), include two main fractions, humic acids and fulvic acids and are the most important components of nonliving soil organic matter. They are produced by the decay of organic materials. In the present study we tested whether the addition of humic substances (humic acid and fulvic acid) to nutrient solution improve crop yield, quality and postharvest life of gerbera. The effect of six concentrations of humic substances (humic (HA) and fulvic acid (FA)) were examined on growth and postharvest life of gerbera cv. "Lourdes" at Isfahan university of technology, Iran. Plants were grown in 90- 6 L pots containing a mixture of straight with peat moss, perlite and lica (6:3:1). Three replications per treatment were involved in a randomized complete block design. The pots were irrigated from upper part with nutrient solution. HA and FA applied to solutions in six combinations including control, 80 mg/l HA + 20 mg/l FA, 60 mg/l HA + 40 mg/l FA, 40 mg/l HA + 60 mg/l FA, 100 mg/l FA and 50 mg/l FA. Number, fresh weight of flowers, head diameter and length of scapes were taken from the flower production in 9- month period. For postharvest experiment uniform flowers were kept in 500 mL distilled water at  $26 \pm 2^\circ\text{C}$ ,  $60 \pm 5\%$  relative humidity, and 16/8 h photoperiod. Every three day flowers were weighted while renewing water. The flower bending incidence (bending of capitulum over  $90^\circ$ ) and vase life (vase life terminated by bending or petal wilting) were recorded daily on 12 flowers per treatment. At the end of experiment fresh and dry weight of shoot and root, diameter, number and length of roots were recorded. The concentration of total nitrogen of leave and calcium, iron and zinc of the leaves and scapes were determined. Data were analyzed by the LSD comparisons of means using procedure within the SAS statistical system. Although HA and FA application did not significantly improve flower weight, scape length and fresh and dry weight of shoot but they enhance yield (number of harvested flower per plant), flower diameter, flower vase life and number, fresh and dry weight of roots. Yield and root growth increased at 50 mg/l FA incorporated into the solution. The results showed that 50 mg/l FA was the most effective treatment and extended the vase life by 8 days and prevented and delayed bent neck incidence. On the other hand all HA and FA treatments could decrease water loss after 6 and 12 days in comparison to control. Total nitrogen of leaves were significantly enhanced by HA and FA. Results indicated that FA and HA incorporated into the solution increased macro- and micronutrient contents of leaves and scapes. However, 100 mg/l FA and 60 mg/l HA+ 40 mg/l FA decreased Ca of leaves and Fe of the scapes. These effects which seems to be concentration - related could be due to hormone - like activities of humic substances through its involvement in cell respiration and antioxidant and other enzymatic reactions. It was

concluded that humic and fulvic acid can improve quality and quantity of cut gerbera through increasing nutrient uptake, chelating effect and hormone like activities.

**Key Words:** plant nutrition, nutritional elements, flower yield and quality, vase life, cut flower.