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Effect of different silicon sources on floral quality and vase life of two commercially important varieties of cut roses (*Rosa hybrida* L.)

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Abstract

Rosa hybrida L. is an important commercial cut flower in Sri Lanka with high demand in the local as well as the export markets. However, failure to meet expected quality standards in cut flowers is an obstacle in expanding this profitable industry. This study aimed to assess the impact of specific silicon treatments on enhancing the vase life and cut flower quality of two rose varieties, namely Grand Gala (GG) and White Success (WS), in a greenhouse trial arranged in a Completely Randomized Design (CRD) with three replications per treatment. Rose plants, two months after bud grafting and grown in a standard growth medium of topsoil, cow dung, and sand (in a 5:4:2 ratio) were subjected to different treatments to evaluate the effect of selected silicon treatments on their cut flower quality and vase life. The treatments included foliar sprays of sodium silicate (Na₂SiO₃) at concentrations of 0, 50, 100, and 150 ppm, and drenching with potassium silicate (K₂SiO₃) at concentrations of 0, 80, 150, and 200 ppm, both applied on a weekly basis for five weeks. The experiment was set up in a Completely Randomized Design (CRD) with three experimental units per treatment. Incorporation of rice husk ash (RHA) into growth media at establishment (0, 50, 80, and 100 ppm) and drenching with K₂SiO₃ (150 ppm) significantly improved the stem length (cm), basal and apical stem diameters (mm), bud size (mm) and full bloom size (cm), and fresh weight (g) of flower buds in both cut rose varieties (Grand Gala and White Success) when compared to their respective controls (p<0.05). The basal diameter (mm), bud fresh weight (g), bud (mm), and full bloom size (cm) of variety GG were enhanced by the RHA 100 ppm treatment. The plants treated with K₂SiO₃ (all levels) stored a significantly high amount of silicon in all different parts of the cut flower. In variety GG, silicon was deposited more in the leaves, while it was highest in the flowers of variety WS. The highest vase life of around 12 days for GG was observed in plants treated with 100 ppm of Na₂SiO₃ and 80 ppm of K₂SiO₃. This was followed by 150 ppm of K₂SiO₃, which was not significantly different from the previous two treatments, but was significantly better than all other treatments (p<0.05). Moreover, lightness (L*) of petals significantly reduced in WS while significantly highest redness (a*) is reported in GG cut flower petals treated with 150 ppm and 200 ppm of K₂SiO₃ drench (p<0.05). This study demonstrate that silicon sources have beneficial effects on improving the floral quality characters of the two cut rose varieties grown under greenhouse conditions. In conclusion, it can be recommended that applying a K₂SiO₃ drench of 150 ppm is the most effective treatment for enhancing the overall quality parameters in both varieties.

Keywords; Floral quality, Rice husk ash, Roses, Silicon, Vase life

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