Effect of silicon on qualitative and biochemical attributes of cut rose grown under water scarcity

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Abstract

Silicon (Si) is a beneficial element for on plant growth and development that plays an important role in plant resistance to environmental stresses such as salinity and drought. The present research was conducted to study the effect of Si and water deficit on biochemical, physio-morphological and qualitative traits of cut rose cv. Club-Nika under greenhouse conditions. The factorial experiment had three levels of Si (0, 0.5 and 1 mM) and three levels of water deficit (100 (control), 75 and 50% of the irrigation needs), combined in a completely randomized blocks design with four replications. In the current research, qualitative attributes such as number of extra-quality stems, shoot diameter, flower diameter and biochemical traits such as chlorophyll and proline content of leaves were measured. Results showed that plants grown in the 100% water-requirement treatment had higher shoot diameter, number of extra-quality stems, fresh and dry weights of flowering shoot, flower diameter, leaf area and relative water content than the plants exposed to water stress conditions. Bud sprouting in the100% water requirement treatment happened faster (about 6.83 days) than the plants under stress conditions. However, water stress treatments (50 and 75 percent) did not affect total number of stems, chlorophyll content and proline content of the leaves. In this research, although addition of 1 mM Si was capable of enhancing most qualitative traits of cut roses, however, this difference was not statistically significant. It seems that lack of effect of silicon treatments might be related to characteristics of silicon distribution in the leaves and also ineffectiveness of these treatments on cuticular transpiration and stomatal conduction. Generally, the results showed that cut roses adapted themselves through changes in morphological characteristics and not any other mechanisms like osmoregulation such as proline synthesis.

Keywords: Cut rose, Soilless culture, Proline, Adaptation process.

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