The effects of pretreatment duration with silicon on salt stress in Iranian borage (*Echium amoenum* Fisch & C.A. mey)

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Abstract

Silicon has beneficial effects on growth, yield and improvement of the tolerance of some plants against biological and non-biological stresses. In order to study the effects of different concentrations of silicon (as Na_2SiO_3) on Iranian borage (*Echium amoenum* Fisch & C.A. mey), three levels of silicon (0, 0.2, 0.7 mM as Na_2SiO_3) and two levels of salinity (0 and 100 mM as NaCl) and two silicon-treatment durations (long time, 30 days, and short time, 15 days)) were considered. Borage plants were cultivated in hydroponics system in greenhouse and were treated with the abovementioned treatments. The experiment was carried out as completely randomized design with two factors of silicon and salinity and four replications. Some of the biochemical and physiological parameters related to salinity and silicon stress were investigated for short- and long – time periods. Based on the results, the proline content, reduced sugar, antocyanin, malondialdehyde, total chlorophyll and fresh and dry weights were changed significantly ($P<0.05$) in long-term silicon treatment and had some differences with short-time silicon treatment. In general, the results of this study indicated that proper concentration of silicon (0.2 mM), along with long-time silicon treatment, was effective on stress tolerance of Iranian borage plant.

Keywords: Medicinal plants, *S*alinity stress, Malondialdehyde.

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