

Abstract

In order to investigate the effects of drought stress and foliar silicon acid spraying on quantitative and physiological characteristics of borage (*Borago officinalis*), an experiment was conducted as split plot based on randomized complete block design with three replications in 2014 at the University of Zabol research farm in Zahak. Treatments included drought stress at three levels; control (90% FC), mild stress (70% FC) and sever stress (50% FC) comprising the main-treatments and four levels of silicon acid sprying including 0 (control), 2, 4 and 6 mM as sub-treatments. Results indicated drought stress had significant impact on proline content, soluble carbohydrates, chlorophyll index (SPAD), fluorescence of chlorophyll (Fv/Fm), chlorophyll a, b, carotenoids. Silicon acid spraying had impact on all measured traits except number of leaves per plant, number of branches per plant, inflorescence height, relative water content, chlorophyll a and chlorophyll b. Interaction of drought stress and silicon acid spraying on the number of flowers per plant, fresh and dry weight, flower yield, biological yield, proline, soluble carbohydrates, chlorophyll fluorescence, chlorophyll a, b and carotenoid content was significant, and the greatest content of proline equals to 0.7847 mg.g⁻¹ fresh weight was achieved at sever drought stress and silicon application. In addition, the greatest flower and biological yield equal to 520 and 1187 kg.ha⁻¹, respectively was observed at sever drought stress and silicon application at 4 mM. Interaction of drought stress and silicon acid spraying was not significant on number of flowers per plant, number of branches per plant, inflorescence height, relative water content, chlorophyll (SPAD) and total chlorophyll. The greatest flower yield (520 kg/ha⁻¹) were obtained in drought stress along with application of 4 mM silicon acid, Overall results suggested that silicon acid application mitigate drought stress impact and led to increasing drought tolerance of borage. Since flower and flowering branches of plant has economic value, 4 mM silicon acid application recommended to obtain greatest flower yield under drought stress conditions.

Key words: Yield, Biological yield, Proline, Chlorophyll



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**Effects of silicon acid on quantitative and physiological
traits of borage (*Borago officinalis* L.) under drought stress**

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