[Downloaded from jstnar.iut.ac.ir on 2024-10-12]

[DOR: 20.1001.1.24763594.1394.19.72.20.0]

[DOI: 10.18869/acadpub.jstnar.19.72.20]

Effects of Silicon Supplementation on Growth, Chemical Composition and Some Physiological Properties of Rice (*Oryza sativa* L.) under Saline Conditions

J. Saleh*, N. Najafi and S. Oustan[1]

(Received: Oct. 18-2012 ; Accepted : May 26-2015)

Abstract

The present study was conducted in order to investigate the effects of silicon and salinity on growth, chemical composition and physiological properties of rice var. Hashemi, in the greenhouse of agricultural college of University of Tabriz during 2011. It was arranged as factorial based on a completely randomized design with three factors consisting of silicon at four levels (control, 100, 200 and 300 mg/kg soil), salinity at four levels (control, 2, 4 and 8 dS/m) and source of salinity at two levels (NaCl and combination of different salts) with three replications. The results showed that increasing soil salinity resulted in a decrease in shoot dry weight, catalase activity and concentrations of phosphorus, potassium and reducing sugars, and an increase in glycine betaine content in the plants. The comparison between two sources of salinity also revealed that plants treated with a combination of salts experienced less vigorous decrease in dry weight and potassium, and reducing sugars' concentrations. Meanwhile, the enhancement in glycine betaine content appeared to be less intense in these plants. Hence, it could be concluded that the salinity resulting from a combination of different salts caused less damage to plants than NaCl salinity. Silicon supplementation resulted in increasing of shoot dry weight, catalase activity and concentrations of reducing sugars, glycine betaine, phosphorus and potassium. Therefore, silicon nutrition alleviated suppression effects resulting from the presence of soil salts, which means, enhanced the salt tolerance of rice.

Keywords: Catalase, Glycine betaine, Rice, Salinity, Silicon.

1. Dept. of Soil Sci., Agric. College, Univ. of Tabriz, Tabriz, Iran.

*: Corresponding Author, Email: jsaleh11@yahoo.com