

Comparison of the effects of drought stress and salinity on germination of radish seeds (*Raphanus sativus* L.)

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Abstract

In this research, effects of drought stress and salinity on germination characteristics of radish seeds were evaluated. The experiment was carried out as a factorial based on two factors in a randomized complete block design with three replications in Seed Technology Laboratory, Faculty of Agriculture, Shahed University, Tehran. Experimental factors consisted of four levels of salinity stress (0, 40, 80, 120 mM) and four levels of drought stress (0, -0.3, -0.4, -0.6 Mpa) and three levels of pretreatment of seeds primed with potassium nitrate (0.3 g), salicylic acid (0.5 g) and distilled water, in Liters. This experiment was conducted using calcium chloride salt and four levels of drought stress. The main effect of drought stress and salinity on germination of radicle seed was significant and the interaction of salinity and stress in studied traits including germination percentage, root length, shoot length and seedling dry weight were significant. The results of analysis of variance showed that the effect of different levels of salinity stress on all studied traits was very significant ($p < 0.01$). The maximum radish germination was observed in the control treatment and its germination stopped at 120 mM. The effect of different levels of stress Drought on all traits except germination percentage and germination rate was very significant ($p \leq 0.01$). In general, it was determined that the effect of salinity stress on percent and germination rate was due to the effect of salicylic ion and the resulting osmotic potential. Salinity stress had no significant effect on reducing germination, while reducing the traits related to seedling growth were both factors of ionic toxicity and osmotic potential. The effects of drought stress and salinity on the germination pattern of radicle seed were similar, so that the osmotic potential of 4/4 Mpa later radish seeds decreased in each drought stress condition and salinity.

Keywords: Drought stress, Salinity stress, Germination, Radish.