

Abstract

Seed priming is one of the improvement methods that can improve germination, emergence and plant yield in the worse environmental conditions. Two separate tests were conducted in laboratory, to evaluate the germination behavior of sugar beet under effects of priming treatments. The first experiment examined the effect of time (3, 6, 12, 24 and 48 hours) and concentration (25, 50, 100, 200 and 400%) of two types of stimulants (Seed-start and Humic acid). The second experiment is consisted of seed priming times (3, 6, 12, 24 and 48) of two methods of hydration in water (running water and soaking in a Petri dish). The results showed the lowest time (3 hours) and the lowest concentration (25%) of priming of the Seed-starter and the humic acid are desirable to improve sugar beet seed germination. The method of running water (48%) had better effect compared to soaking in a Petri dish (45%). In both the length of root and stem the concentration of 25% and 400% of the stimulants were the highest and lowest, respectively. The length of root and stem were higher in running water (48 hours) than hydropriming. The impact of method and time of priming on germination rate showed the same trend like percentage of germination. Impact of stimulants can be because of nutrition element and influence of leaching with running water can be because of washing the inhibitive material on the seed coat. Seed-start treatment (Concentration of 25% with 3 hours) and leaching with running water (48 hours) can be introduced as the best treatment.

In the spring of 1393, a field trial was conducted simultaneously in two regions of the Jovain and Jajarm. The experimental was conducted as split plot (split-split plot) in randomized complete block design with three replications. The main factor was irrigation with four levels of 100, 90, 80 and 70% water (16000, 14400, 12800 and 11200 m³), sub-plots are including different methods of priming: control, priming with running water for 48 hours, priming with running water for 48 hours + Humic acid, priming with running water for 48 hours + Seed-start and priming with running water for 48 hours + Humic acid + Fulzym, sub-sub plots are including weeds competition with (absence and presence of weeds). The results of field experiment showed that by increasing the amount of irrigated, sugar beet emergence increased significantly in both the Jovain and Jajarm. It was found that priming with running water for 48 hours and non-priming were the highest and lowest percentage of emergence respectively. Priming with running water for 48 hours + Seed-start and priming with running water for 48 hours + Humic acid + Fulzym showed highest tuber yield in both the Jovain and Jajarm. Results showed tuber yield decreased by decreasing irrigation and priming methods improved tuber yield under reduction of irrigation and presence of weeds in both the Jovain and Jajarm. The results of quantitative attributes showed increasing severity of drought stress and presence of weeds increased sugar impurities such as potassium, sodium and nitrogen in both regions. On the other hand, sugar yield decreased under these treatments. Seed priming caused increasing in sugar percent and sugar yield in both regions and among the various levels of priming, priming with Seed-start showed highest sugar yield. Also, it was concluded drought and weed interference have greater influence on root yield compared to sugar content and thereby reduced sugar yield. In the end, due to the positive effects of priming, such as running water 48 hours and Seed-start on quantitative and qualitative characteristics of sugar beet these methods are recommended.

Key words: leaching with running water, priming concentration, priming time, Seed-start solution, tuber yield